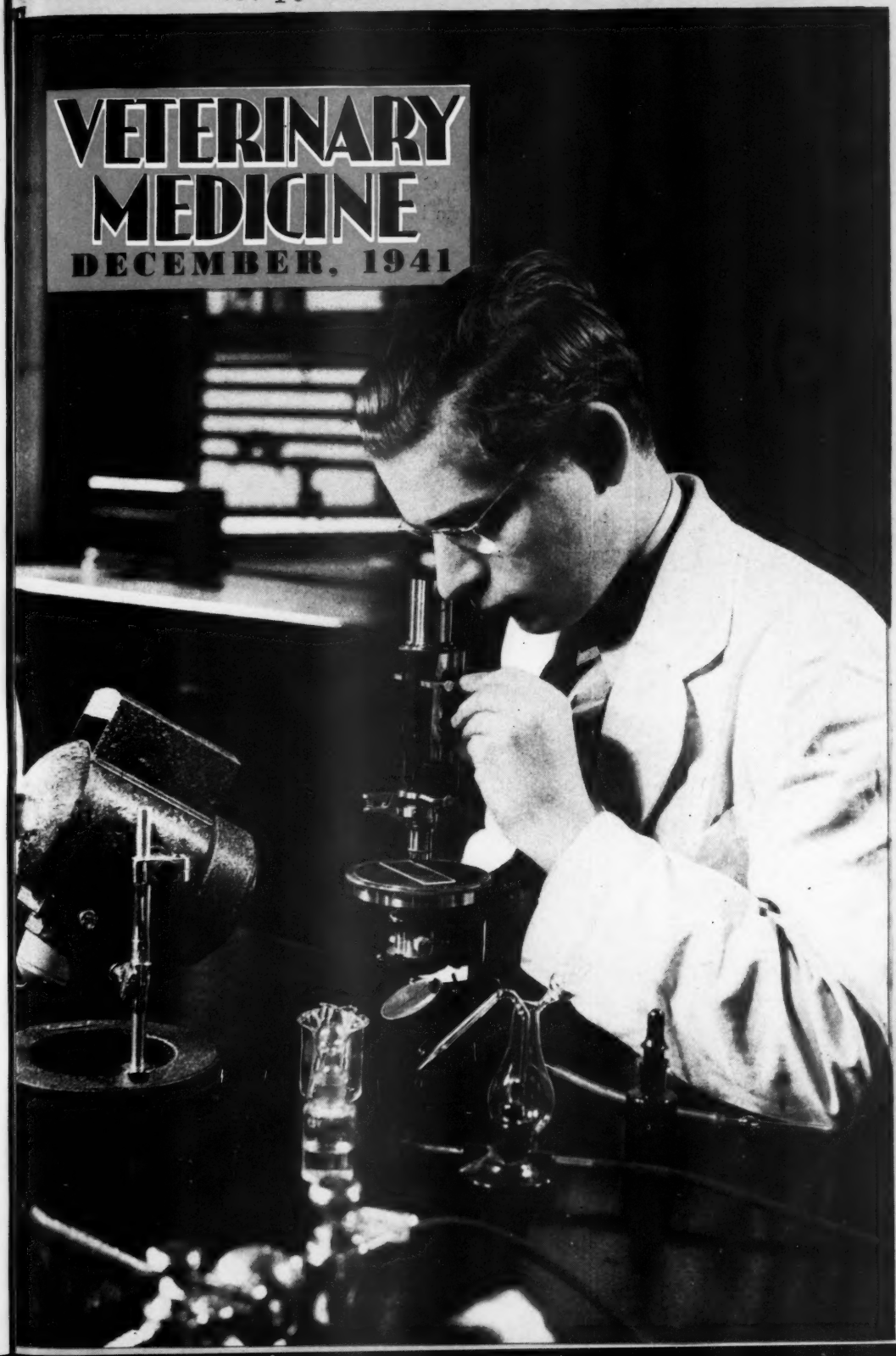
$4.00 a Year NOV 19 1941 Published Monthly 35c a Copy

VETERINARY MEDICINE

DECEMBER, 1941



For Complicated Milk Fever

when low blood serum Calcium may be complicated by low blood serum Magnesium and Ketosis—

USE JEN-SAL

D-C-M Solution

A stable solution, each 500 c.c. containing 3½ ounces Dextrose, 3-7/10 ounces Calcium Borogluconate, and 2/3 ounce Magnesium Borogluconate, with traces of Phosphorus.

THE MOST PRACTICAL, COMPLETE AND ECONOMICAL CALCIUM PRODUCT ON THE MARKET

The clinical picture of the true Milk Fever case merges into that seen in cases of low serum Magnesium so that no clear-cut distinction is possible, but these cases which relapse may show a lowered serum Magnesium.

500 c.c. bottles—per dozen, $7.50; 3 dozen, $21.37; 6 dozen, $40.50; 12 dozen, $76.50

Discount 10 and 2%

ORDER FROM YOUR NEAREST JEN-SAL DEPOT

JENSEN-SALSBERY LABORATORIES, INC.

KANSAS CITY, MISSOURI

25
NEMAZENE TABLETS
(REG. U. S. PAT. OFF.)
12.5 Gm.
Each tablet contains 12.5 Gm. of Phenothiazine.
PARKE, DAVIS & CO.
DETROIT, MICH., U.S.A.
A New Veterinary Anthelmintic for oral administration or mixing with feed

NEMAZENE TABLETS

(Phenothiazine, 12.5 Grams)

To the medicinal grade of phenothiazine contained in each Nemazene Tablet we have added a special "wetting agent" which hastens disintegration—about 1 minute in warm water. The resulting uniform suspension can be readily and quickly mixed with feed or given as a drench, without preliminary fasting. Animals also swallow the tablets readily when administered with Nemazene Forceps or a balling gun.

Nemazene Tablets are available in boxes of 25 and 100.

For descriptive literature and detailed information address

Animal Industry Department of

PARKE, DAVIS & COMPANY

DETROIT, MICHIGAN WALKERVILLE, ONTARIO

VETERINARY MEDICINE

Registered in U. S. Patent Office

VOL. XXXVI DECEMBER, 1941 No. 12

Published Monthly by the

VETERINARY MAGAZINE CORPORATION

7632 S. CRANDON AVE., CHICAGO, ILL., U. S. A.

$4.00 a year; per copy 50 cents; Special Issues $1.00

All matter appearing in this publication is copyrighted. No part of it may be reproduced without specific permission. Permission will be given if the purpose is unobjectionable. If there be any question as to the propriety of reproduction the author will be consulted.

Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of March 3, 1879. Entered as second-class matter under the title of American Journal of Veterinary Medicine July 19, 1910, at Chicago, Ill., under the Act of March 3, 1879.

D. M. CAMPBELL, *Editor*
7632 S. Crandon Ave., Chicago, Ill.
Telephone South Shore 7160

H. J. MOSTYN, *Eastern Representative*
1265 Broadway, New York, N. Y.
Telephone Murray Hill 4-4037

COPYRIGHTED, 1941, BY VETERINARY MAGAZINE CORPORATION

CONTENTS

Veterinary Medicine in 1941 585-589

Military Veterinary Service, 585; The Animal Disease Situation, 587; Veterinary Legislation, 588; Veterinary Medical Organizations, 588; Veterinary Education, 589; Veterinary Literature, 589.

Review of Veterinary Periodical Literature, 1941 590-628

HORSES: Horse and Mule Production in the United States, 590; Variations in the Calcium, Phosphorus, and Serum Proteins of Horse Blood, 592; Vitamin A Deficiency in Horses, 593; Phenothiazine as an Equine Anthelmintic, 593; Effects of Injected Histamine, 594; Sensitization and Periodic Ophthalmia, 594; Treatment of Horses Exposed to Chemical Warfare Agents, 594.

CATTLE: Developments in the Therapy of Shipping Fever in Cattle, 596; A Simple Field Test for Mastitis, 597; Acriflavine Therapy for Streptococcic Mastitis, 597; Use of Gramicidin and Other Agents in Chronic Mastitis, 598; Novoxil Treatment of *Str. Agalactiae* Infections, 600; Disinfection of Teat Cups, 600; Treatment of Acetonemia, 600; Diagnosis of Bovine Pseudorabies (Mad Itch), 601; Johne's Disease and the Tuberculin Test, 602; Hereditary Transmission of Anaplasmosis in Ticks, 602; Mosquitoes and Anaplasmosis, 602; Horseflies and Anaplasmosis, 602; The Rocky Mountain Wood Tick and Tick Borne Diseases, 603; The Pharmacology of Sulfapyridine in Cattle, 604; Yeast in the Treatment of Trichostrongylosis, 604; Deficient Rations in Cows, 605.

SHEEP: Enterotoxemia from Overeating in Feedlot Lambs, 606; Causes of Outbreaks of Abortion in Ewes, 607; No Carryover of Vibrio Infection, 607; Production of Heat and Ovulation in Anestrous Ewes, 607; Diagnosis and Treatment of Listerellosis in Sheep, 608; Phenothiazine for Sheep, 609; Abscesses Affecting the Central Nervous System of Sheep, 609; Ovine Balano-Posthitis, 609.

SWINE: Disinfection of Premises Following Swine Erysipelas, 610; The Cultural and Biochemic Properties of *E. Rhusiopathiae*, 610; Endocarditis Not Diagnostic of Swine Erysipelas, 611; Efficacy of Crystal-Violet Vaccine against Hog Cholera, 611; Sulfaguanidine for Enteritis in Swine, 612; The Nutritional Requirements of Swine, 612; Pig Anemia and Immunity, 613.

SMALL ANIMALS: The Nutritional Requirements of Dogs, 614; Use of Vaccine in Chronic Staphylococcus Infections, 615; Treatment of Pyometra by Marsupialization, 615; Blood Transfusions in Dogs, 616; Treatment of Heartworm, 617; Encephalitis in Dogs, 618; Potency Test for Rabies Vaccine, 618; The Principle of Tissue Autolysis, 618; Intestinal Atony in Old Dogs, 619.

POULTRY: Swine Erysipelas in Turkeys, 620; Tests for Pullorum Disease, 620; Sulfathiazole for Coryza, 620; Transmission of *T. Gallinae*, 621; Tin Preparations for Tapeworms, 621; Sulfaguanidine for Coccidiosis, 621; *H. Meleagridis* in Chicks, 621; Etiology of Perosis, 622; Rickets from Sulphur Feeding, 622; Sulphur Therapy for Coccidiosis, 622.

TECHNICS AND MISCELLANEOUS: A Practical Dilution-Egg-Count Procedure, 623; Flotation Solutions Compared, 624; Intravenous Anesthesia in Large Animals, 624; Chemotherapeutic Testing, 625; Transmission of Immunity, 625; P-Aminobenzoic Acid, 626; Coccidioidomycosis, 626; Salmonella Types in Foxes, 626; Intraperitoneal Administration of Sulfanilamide, 626; Milk Control on the Farm, 627; The Veterinarian's Role in the Conquest of Human Disease, 627.

Index of Volume XXXVI 629-636

THE FRONT COVER

In keeping with the contents of this issue, the front cover picture this month symbolizes the spirit of scientific research.

VETERINARY MEDICINE

Registered in U. S. Patent Office

Leading Publication in the Veterinary Field for More Than Thirty Years

VOL. XXXVII NOVEMBER, 1941 No. 11

Veterinary Medicine in 1941

The year 1941 has been an eventful one in world history. Attention has naturally been focused chiefly on World War II, the repercussions of which have been felt in every corner of the globe and in every sphere of human endeavor. The implications for the veterinary profession have been manifold. While war acts as a stimulus to technical progress in both human and veterinary medicine, the breakdown of communications between belligerent nations impedes the interchange of knowledge thus gained, and the exigencies of war retard the course of all scientific research not immediately applicable to the problems at hand. In addition, the machinery of disease control may be seriously dislocated in a country which is the terrain of battles or the pathway for armies.

During 1941, the veterinary profession of the United States has been in the position of having the stimulus of threatened war without the handicaps of actual participation. It has met well the challenge of the situation.

The lesson of World War I, that adequate veterinary service is essential to an adequate food supply of a nation, has not been forgotten in the defense program of this country. Recognizing the existing shortage of veterinarians and the vital importance of the food and live stock industry to national health, the Selective Service headquarters in May, 1941, instructed the local draft boards to place veterinarians and veterinary students in deferred classes. Veterinarians already inducted into the military service under the Selective Service Act, as well as those who might be inducted in the future, were advised that they might apply for commissions in the Veterinary Corps Reserve and that, if found qualified, they would be commissioned and placed on extended active duty immediately. These two measures had the effect of reducing the number of veterinarians serving in the national defense forces in a non-professional capacity, thus making provision for full utilization of the needed services of the profession in both the military and the civilian sphere.

Military Veterinary Service

The sevenfold increase in the nation's armed forces during 1941 necessitated a large increase in the veterinary personnel—approximately a 400% increase. This made imperative many changes in the Army's veterinary training program. A food inspection school was established at Chicago in which about 175 veterinary officers have received training. The courses of the Medical Field Service School at Carlisle Barracks and at the Army Veterinary School in Washington, which were formerly in the nature of postgraduate courses, have been changed to shorter basic courses to meet present requirements. Schools for training enlisted veterinary personnel were established at Camp Grant and at Ft. Bliss.

There has been considerable reassignment of veterinary officers and enlisted personnel to meet the changed conditions. The extraordinary procurement of horses has required more veterinarians as members of purchasing boards, the enlarged remount service more veterinarians to serve them, the greatly augmented purchase of food more veterinarians for inspectors, and extension of laboratory service more veterinarians to carry it out. In each of the nine corps areas there is now a veterinarian in charge of veterinary activities. Plans call for an Army veterinarian in each of the four field armies, a veterinarian for each Army

corps, and one for each division whether or not it includes animals. Organizations possessing animals have a veterinary service with each regiment. In addition one or more veterinary officers are assigned to all important Army posts and to Army bases in the Caribbean, Newfoundland, and elsewhere.

The large veterinary organizations include a veterinary troop with each cavalry division, a veterinary company (separate), veterinary evacuation hospitals and a Veterinary General Hospital with the field armies.

Those who recall the utter confusion that accompanied the sudden induction of more than 1,300 veterinary officers into the military service during the late summer and early winter of 1917 cannot but be astonished at the orderliness with which the present augmentation of the Army veterinary service has been accomplished. It is gratifying to see how much was learned from the former debacle. It is doubtful indeed if other branches of the military service have made an analogous improvement over their own attempts to "spring to arms overnight," at the beginning of World War I.

In the words of Col. R. A. Kelser, chief of the Army veterinary service: "The veterinary profession of the United States, both in and out of the Army, has been doing a splendid job in the national defense effort. I am positive that we are all fully aware of our responsibilities and obligations and that these responsibilities and obligations will be assumed and discharged in a manner befitting the traditions of the veterinary profession of this land."

It would be most satisfying if the raconteur could close the summary of veterinary military activities during the year with the foregoing quotation, but both candor and accuracy compel him to say, as Ward Giltner put it, "There is a Diptera in the unguentum." Throughout the year there has been a well-planned and vigorously promoted movement afoot to take Army food inspection away from the Veterinary Corps and lodge it with the marketing service of the U. S. Department of Agriculture. This movement has but very little or no support within the Army. The military is committed to the policy of having the best—of relying upon professionally trained personnel for professional work. It demands the doctor to treat its sick, the engineer to build its bridges, the chemist to devise means of protection against poisonous gases, the professionally trained veterinarian for his job, which includes food and forage inspection. However, the plan to supplant a professional inspection with lay inspection of the Army's food has powerful official support outside the Army and also that of disgruntled contractors who find it burdensome to meet Army requirements relative to the supply of hay and grain for Army animals or canned food for the Army personnel. The meat packers do not support this plan. They remember too well the embalmed beef scandals of the Spanish American imbroglio, which the public has all but forgotten. The movement for lay inspection has adherents in exceedingly high places in Washington, else it could be brushed aside, because the present veterinary food and forage inspection has been one of the most efficient and most satisfactory services of the Army. It will require all the resourcefulness of Kelser to retain for the Army its present competent, professional inspection of food and forage.

Col. Raymond A. Kelser, Chief of Veterinary Division, Surgeon General's Office, War Department

The Animal Disease Situation

The Bureau of Animal Industry of the U. S. Department of Agriculture, under the leadership of its Chief, John R. Mohler, has continued its effective work of building up and protecting the live stock industry of the nation. The bovine tuberculosis eradication program was brought, late in 1940, to the point where now every county of every state in the country is a modified, accredited tuberculosis-free area (less than 0.5% infection of the whole cattle population). The fight against brucellosis, another major scourge of the United States cattle industry, was materially strengthened late in 1940 by official recognition of calfhood vaccination against this disease. In fact the whole project of brucellosis control was saved from the discard during 1941 by this tardy official sanction of vaccination.

On the recommendation of the Bureau of Animal Industry, the Secretary of the U. S. Department of Agriculture placed additional restrictions, during 1941, on the importation of live stock from Europe, where foot-and-mouth disease has spread rapidly since the beginning of the war. There has been no outbreak of foot-and-mouth disease in the United States for 12 years, and every effort is being made to prevent its entrance into this country.

Hog cholera and swine erysipelas are taking a serious toll in the swine-producing areas. We are still reaping the unfortunate consequences of permitting the indiscriminate use of hog cholera serum and virus by unqualified persons, but the Bureau of Animal Industry is cooperating with farmers and practicing veterinarians in attempts, not very promising, to place the control of this disease on a rational basis. Fortunately, the lesson learned in the catastrophic experience with hog cholera is being applied in the control of swine erysipelas. The serum-culture prophylactic treatment for the latter disease, which has proved highly promising as a control measure in extensive trials in Nebraska and Iowa during 1940 and 1941, is being carried out under the strictest supervision by the Bureau. The cultures of *Erysipelothrix rhusiopathiae* are administered only by properly qualified veterinarians.

Outbreaks of dourine in Arizona and California and of anthrax in South Dakota, Texas and Louisiana have not reached serious proportions although in the aggregate the loss has been large. Efforts are being made to control these epizootics and to avoid their spread to new territory.

John R. Mohler, Chief of the Bureau of Animal Industry, U. S. Department of Agriculture

Early reports indicate that this has been a severe year for equine encephalomyelitis, in spite of the efficacy of intradermal vaccination with chick embryo vaccine. The encephalomyelitis picture has been complicated during 1941 by the spread of the eastern type west of the Appalachians, and by the discovery that St. Louis encephalitis in man is transmissible to horses, and has probably been a factor in some western outbreaks. Encephalomyelitis in cattle and chickens (unrelated etiologically to equine encephalomyelitis) has made its appearance in the midwest. From a public health standpoint the whole encephalomyelitis situation is one fraught with potential danger. The U. S. Public Health Service is studying the problem, in cooperation with physicians and veterinarians.

It has been proposed that the mosquito

may be a vector of equine encephalomyelitis, and that the virus may find a reservoir in nature in wild birds. Epidemiological studies of a human outbreak of encephalitis in North Dakota this year, which proved to be caused chiefly by the western type of equine encephalomyelitis virus, lend weight to both these suppositions. The age-sex distribution indicated that persons more available to mosquitoes contracted the disease more frequently than did others. That there is a reservoir for the virus, other than horses, was suggested by the fact that the disease in horses in North Dakota was not particularly severe this year. Cox and Hughes of the U. S. Public Health Service succeeded in isolating the western type virus from the brain and spleen of a naturally-infected prairie chicken from a section of the country which was one of the chief foci of the epidemic.

Outbreaks of rabies in various parts of the country this year have underlined the necessity for intelligent, concerted action in the control of this disease. Local health authorities in many communities are enforcing annual vaccination by veterinarians of all dogs and other control measures have been instituted in sections where rabies has been prevalent; but the need for a uniform planned attack on the disease is still an urgent one. An advance made during the year was the improvement of rabies vaccine through its testing under government supervision.

Veterinarians are cooperating with public health workers in several other fields. For example, a relationship between poliomyelitis in man and certain animal diseases has been suspected. In Mississippi the Live Stock Sanitary Board, headed by Dr. E. S. Brashier, State Veterinarian, is assisting the State Board of Health and the National Infantile Paralysis Foundation by making an investigation of all sick animals on the premises where there are or recently have been cases of poliomyelitis in man. The data being gathered includes information about all animal diseases occurring on the premises for several months prior to and at the time of the poliomyelitis case, as well as notations on sanitation and insect infestations.

Veterinary Legislation

More effective control over veterinary biological products is aimed at by Amendment 15 to B. A. I. Order 276, to take effect January 1, 1942. Distributors, producers and importers will be required to keep permanent, detailed records of the sale, shipment or disposition of all viruses, serums, toxins, and analogous products. If the product consists, either in whole or in part, of live virus or live organisms, and the shipment is made interstate, the shipper must forward, immediately, a notice to the Bureau of Animal Industry and to the proper live stock sanitary official in the state to which it is consigned. This regulation will have the effect of permitting the veterinary officials in the several states to exercise more effective control over outbreaks of disease due to such agents.

Veterinary legislation has been proposed or enacted in several states. In some cases (e.g. Texas, Illinois, Oregon, and Washington), revisions of veterinary practice acts are under consideration; in others, regulations relating to the supervision of live stock markets or to the sale of biological products to other than licensed veterinarians. For example, the General Assembly of North Carolina passed "An Act to Regulate and Supervise Public Live Stock Markets and Dealers in Live Stock and to Prevent the Spread of Contagious and Infectious Diseases of Live Stock," and the Colorado Legislature enacted a law to prevent the manufacture or sale of animal biological products, including serums, vaccines, bacterins, viruses, except under license from the division of serum-virus control of the United States B. A. I. During the year many communities have passed ordinances making meat inspection and the anti-rabies vaccination of dogs compulsory. In the main, the trend of this and similar legislation has been toward the furtherance of animal disease control by placing it in the hands of qualified veterinarians.

Veterinary Medical Organizations

The American Veterinary Medical Association has had a successful year. There has been about a 500 increase in membership. The annual meeting at Indianapolis was

well managed and well attended. Early this spring a special Committee on Veterinary Participation in National Defense was appointed to cooperate with the government's agencies engaged in the defense program. Officials of the association assisted in compiling and presenting data showing the need for veterinarians and veterinary students in the national economy; this was of aid in influencing the decision of the Selective Service headquarters to place members of the veterinary profession in the same class with the medical and dental professions with respect to advising their deferment by local draft boards.

The U. S. Live Stock Sanitary Association's 44th annual meeting, held in December, 1940, was an outstanding one. Details of this were given in the January, 1941, issue of VETERINARY MEDICINE.

The Practitioners' Association, the newest of the national veterinary organizations, continued to thrive during 1941, as did the National Association of B. A. I. Veterinarians; the former achieving a particularly striking growth in membership. The state and sectional associations have attracted a good attendance at their worthwhile meetings and clinics, and many of them have been active in furthering the cause of veterinary medicine in their respective states, through sponsoring legislation, cooperating with health authorities, and the like.

Veterinary Education

The responsibility of the veterinary colleges for furnishing a supply of able, qualified graduates is not a light one. They have continued, as in previous years, to raise their standards of education; to stiffen matriculation requirements; and to improve and increase their equipment and teaching staffs, with resulting benefits to their students.

Deferment of induction into military service for veterinary students has already been mentioned. In 1941 the veterinary colleges of the United States graduated 502 students and those of Canada 67.

It is a matter of general knowledge that the existing colleges are not numerically adequate to train the number of students necessary for replenishment and augmentation of the ranks of the profession. Although an overall national shortage of veterinarians is recognized, the number of graduates each year is barely sufficient to replace those lost to the profession by death or retirement. This year brought the welcome news of the enactment of legislation in California providing for the establishment of a veterinary college at the University of California. Beginning with the entering class of August, 1941, a six-year course of study leading to the degree of D. V. M. is being offered. Rumors of a new veterinary college for Illinois have not materialized as yet. However, the Department of Veterinary Pathology and Hygiene at the University of Illinois has expanded its curriculum somewhat and is offering a preprofessional veterinary course. Appropriations totaling $225,000 have been authorized for additions to its physical plant.

Two new veterinary buildings are being erected at a cost of $550,000 at Washington State College.

Veterinary Literature

New editions of two excellent works (Hull's *Diseases Transmitted from Animals to Man* and Runnells' *Animal Pathology*), as well as several books on subjects related to veterinary medicine and many reports, booklets, and the like, appeared during 1941. Reviews of these may be found in the book review section of VETERINARY MEDICINE for the past year.

In the field of periodical literature, the *American Journal of Veterinary Research*, which made its initial bow in October, 1940, completed its first year with distinction. Much of value to the practitioner, as well as to the research worker, has been published in this and other American journals during the year. Abstracts of articles published in these journals, which are of scientific importance or practical value, appear on the following pages. (Abstracts of important articles from foreign veterinary periodicals are published currently in VETERINARY MEDICINE throughout the year.)

Horses

Horse and Mule Production in the United States[1]

It is estimated that in the United States the live, healthy foal crop is only about 50% of the total number of brood mares maintained. Experience has shown that if a definite program is followed by competent persons, the percentage of pregnancies and livability of foals will show an increase that will more than offset the trouble and expense involved.

Heredity and nutrition are important factors. Care and consideration should be given to the selection of mares for breeding and of the stallions and jacks used as sires. The quantity and quality of the feed must be considered. In general, the cheapest and most satisfactory source of essential nutritive elements is the natural feed stuffs; there is considerable evidence to indicate that these elements are more readily assimilated and more effectively metabolized when in the form in which they are found in natural feeds than they are in synthetic concentrates. Of course, where the available natural feed stuffs are deficient in some of the essential elements, it may be more practical to supply them in concentrated form.

Following the close of the breeding season all mares that have been bred should be examined for pregnancy. The mares found to be in foal should have proper feed and care during the gestation period. All nonpregnant mares should, during the fall of the year, be given a thorough clinical examination. The barren mares found normal need no special attention and will be ready for service early the next spring. Those found to have an infection of the genital tract should be treated as the condition of each individual dictates, considering the age, the condition involved, and the value of the mare in coming to a decision about treatment. Prevention of infections or treatment in the early stages is more satisfactory than attempting to cure chronic cases.

In cases of metritis with mucopurulent exudate, uterine douches are indicated. Nonirritating chlorinated antiseptics such as veterinary zonite; acriflavine, proflavine, aqueous metaphen, azamine, and many others have been used with good results. When the profuse exudation has been controlled and the uterus has a good tone and contracts well, a few applications of small amounts (½ to one pint) of such agents as mineral oil and iodine, aqueous metaphen, 1-3000 azamine in capsule or suspended in mineral oil, are beneficial.

It not infrequently happens following normal birth of a healthy foal that contaminated material finds its way into the genital tract. If the mare is in good physical condition and there are no injuries or

[1] Dimock, W. W., 1941. Horse and mule production. *J.A.V.M.A.* 98:770, pp. 369-380.

other abnormalities at the time of parturition, such material is rapidly expelled through the excretion of physiological lochia. But if the mare is in poor physical condition, or the vagina or cervix is lacerated and abnormally dilated following delivery, or if there is delayed involution of the uterus, or other abnormalities, bacteria may become established in the genital mucosa, leading to endometritis and metritis unless the condition is effectively dealt with. It is therefore worthwhile to make a visual examination of the vagina, regardless of external manifestations, between the second and sixth day after parturition. For mares not making a normal recovery, it is advisable to cleanse the uterus by thorough douching, draining it as completely as possible, and then insert into it from ½ to one pint of a heavy mineral oil containing a small quantity of iodine (½ dram of iodine crystals in one gallon mineral oil). Lacerations should be sutured at once. For a dilated, relaxed vulva it is well, after thorough cleansing of the uterus, to suture the vulva at the upper commissure down a distance of one to two inches to prevent continuous seepage into the vagina. No mares showing any abnormalities should be admitted to service on the ninth day.

Streptococci are the most common cause of infection of the genital tract of mares. Streptococcic infection may prevent conception, cause abortion, or result in diseased foals. Less commonly, *Salmonella abortivoequina, Shigella equirulis* and *Corynebacterium equi* are found as genital pathogens in mares. Because of the high incidence of sterility, abortions, and diseases of the newborn resulting from the breeding of infected mares, it should be a matter of policy (1) to admit to service only mares with a normal, healthy genital tract, (2) to mate them to healthy, vigorous, fertile stallions and jacks, and (3) to observe scrupulous cleanliness at the time of service.

Ovarian trouble is next in importance to infection of the genital tract as a cause of delayed conception and sterility. Ovarian disorders include cysts, large or small; fibrosis; tumors; functional disturbances; atrophy. While cysts on the ovaries may not always prevent ovarian function and conception, they do so frequently, and they do not usually disappear without intervention. The most effective and logical procedure is to puncture and drain them. It is recommended that the mare be bred the first time she comes in season following the operation.

Another method of correction worth trying for cystic ovaries, as well as for functional disturbances of the ovaries, is the use of the various glandular extracts now available. (These should never be administered without first determining that the genital tract is free of infection.) Combined with massage, they may also be effective in the treatment of small, hard, fibrous ovaries, even to the point of atrophy..

For tumors of the ovaries or enlargement due to fibrosis, removal is recommended if the size is not too great.

There are many different causes of abortion in mares. Contagious equine abortion is caused by *S. abortivoequina;* it may be diagnosed by positive cultures from the fetus, afterbirth and uterine secretions of the aborting mare and from a positive blood test. Most mares recover without treatment. Vaccination is an effective preventive measure.

Virus abortion is highly contagious. The virus is contained in the fetus, afterbirth and uterine discharges, so that all aborting mares should be immediately isolated and the proper sanitary precautions taken in disposing of the fetus and afterbirth. In virus abortion the onset is sudden without any premonitory symptoms, and the mare returns to normal as promptly as after normal parturition. The fetus, fetal membrane and uterine secretions are usually

Even highly mechanized armies of today require large numbers of horses and mules. Greater production of these animals, as well as efficient control of equine diseases, becomes imperative to meet present demands.

bacteriologically negative, and blood tests are negative to *S. abortivoequina*. Pathologically, most of the aborted fetuses show multiple, small, grayish-white spots of degeneration in the liver, hemorrhages on the heart, and often an excess of serous fluid in the thoracic and abdominal cavities. Histologically, sections of the liver and lungs show intranuclear inclusion bodies.

Abortions due to streptococcic infection or to invasion of the genital tract of the mare by other microorganisms may be kept at a minimum by proper care prior to and during service, as suggested above.

More rarely, abortion may be caused by general debility or organic weakness of the mare, by nutritional disturbances, by functional disturbances of the ovaries, by an endocrine imbalance, or by accidents. The nature of each of these suggests the appropriate remedy.

Of infections of the newborn foal, *S. equirulis* is the most common cause of navel-ill, joint-ill, and pyosepticemia. Unlike streptococcic infection, which has its origin in the genital tract of the mare and may therefore be prevented by reasonable care, *S. equirulis* apparently originates in the digestive tract of the pregnant mare, being carried to the uterus *via* the blood stream. No preventive method has been developed for it.

Other bacteria are occasionally incriminated as the cause of death in foals. In general, there is no good way to deal with these bacterial infections except to prevent the conditions that predispose to them. One of these is parasitism, which is more serious in the young than in the adult. Brood mares should be kept reasonably free from parasites, and mares and foals should be pastured on ground known to be free of viable parasitic larvae. Proper correlation of prevention and anthelmintic treatment is the logical method of attack.

Dystocia, traumatic injury, malformations and delayed parturition cause a number of deaths in foals. However, after these and the cases of known infection are accounted for, there is still a relatively high percentage of cases of unknown origin which awaits further investigation.

Variations in the Calcium, Phosphorus, and Serum Proteins of Horse Blood[2]

The practice of training and racing young horses necessitates early development of strong bone. Bone lesions are frequent in these young animals, often leading to permanent unsoundness or at least temporary loss of their services. There is much reason to suspect a connection between bone weakness and deficiency of calcium and phosphorus in the blood; deficiency of these elements may likewise be associated with low vigor and poor general condition.

In this study total serum calcium ranged normally from 11 to 13.5mg per 100cc, averaging 12.2 (s.d.0.5). Variations within this range could be associated with seasonal change and differences in the feeding, but no influence could be ascribed to age and sex. Pregnant mares showed a tendency toward reduction in total calcium.

The age of the horse appeared to be the most important factor in determining the blood level of inorganic phosphorus. Findings varied grossly from 2 to 8mg per 100cc of serum, receding progressively from a maximum in foals less than three months old to the minimum levels of maturity. Sex, pregnancy, and differences in feeding did not appear to be significant factors, but there was a slight seasonal variation.

Total serum proteins varied normally from 5 to 7gm per 100cc, averaging 6.1 (s.d.0.3). Age, seasonal change and pregnancy induced variations within this range; sex differences and variations in feeding had no bearing on protein levels.

The relatively wide ranges of normal variation in serum calcium and inorganic phosphorus overlap the findings reported for cases of recognized abnormality.

Cases with acute bone lesions (acute arthritis, fracture) revealed a high incidence of blood calcium and phosphorus deficiency, with a reduction in phosphorus quantitatively the greater. In subacute cases (subacute periostitis, ostitis) these effects were progressively less pronounced, apparently

[2] Craige, A. Henry Jr., and John D. Gadd, 1941. The determination and clinical correlation of variations in calcium, inorganic phosphorus, and serum proteins of horse blood. *Am. Jnl. Vet. Res.* 2:3, pp. 227-256.

varying with the degree of active inflammation present. Chronic bone lesions (ringbones, spavins and other exostoses of chronic nature) rarely were associated with calcium and phosphorus deficits in the blood, the averages for this group approximating those for normal horses.

In clinical subjects with diseases of the soft tissues, a tendency toward slight hypocalcemia was observed in respiratory cases (bronchitis, pulmonary emphysema), and diarrhea was associated with marked reduction in the blood levels of both calcium and phosphorus. On the other hand, hypocalcemia was not encountered in connection with symptoms of tetany and various other manifestations of nervous instability, although low phosphorus was observed in two cases with muscular incoordination. The results from examinations of horses with recurrent spontaneous epistaxis (bleeders) failed to reveal any basis for attributing the syndrome to calcium deficiency.

* * * *

Vitamin A Deficiency in Horses[3]

Experimental data are accumulating to incriminate nutritional factors in many equine pathological conditions formerly considered to be due to infection, trauma, or hereditary factors. Where yellow corn or green pasture do not form a part of the ration of horses, the vitamin A intake may not be sufficient for minimum requirements. This study of vitamin A deficiency in horses was therefore undertaken to investigate the pathological manifestations of this deficiency, which may be presumed to be present in greater or less degree in many horses fed common rations.

The 11 horses used in these experiments showed a quite characteristic syndrome on A-deficient diets, including night blindness, lacrymation, keratinization of the cornea, respiratory symptoms, reproductive difficulties, capricious appetite, progressive weakness, and death.

All the animals likewise developed joint involvement with lameness and characteristic rarefying lesions in the joint cartilages. Positive evidence that the joint condition was due primarily to the A-deficiency was not obtained, but since every effort was made to eliminate other nutritional deficiencies (both vitamin and mineral) in the experimental diets, the presumption is strong that this was the case. Varying the calcium:phosphorus ratio from 2:1 to 1:7 in the diets did not seem to play an important role in the nutrition of the animals.

* * * *

Phenothiazine as an Equine Anthelmintic[4]

Phenothiazine in doses of 50 to 100gm removed more than 99% of 362,000 cyclicostomes, 96% of 137 *Strongylus* spp., and 72% of 40 *Parascaris equorum* from 10 horses and one mule. The drug was ineffective for the removal of *Oxyuris* spp., bots, and possibly *Habronema muscae*.

The therapeutic dose recommended is 50gm per animal. Others have concluded that 30gm is an effective dose, and this amount undoubtedly removes many strongyle nematodes; however, the most seriously pathogenic nematodes of the horse (*S. vulgaris, S. edentatus,* and *S. equinus*) produce relatively few eggs and are the most resistant to the action of phenothiazine. Until critical experiments demonstrate that 30gm is effective against these nematodes, the authors are of the opinion that the danger of reduced efficacy against them is greater than the cost or the danger of administering the larger dose.

In toxicity tests, three horses exhibited no significant symptoms following the administration of 500gm of phenothiazine, indicating a therapeutic index of greater than 10:1. A dose of 100gm proved fatal to two horses.

If phenothiazine is administered in the feed, the horse should receive no salt for one week prior to treatment, and should be given daily one pint of mixed oats and bran with two ounces of molasses added. For administration of the drug, 50gm of phenothiazine, five ounces of molasses, and two ounces of salt are added to two quarts of the oats-bran mixture.

[3] Howell, C. E., G. H. Hart, and N. R. Ittner, 1941. Vitamin A deficiency in horses. *Am. Jnl. Vet. Res.* 2:2, pp. 60-74.

[4] Habermann, Robert T., Paul D. Harwood, and W. Haward Hunt, 1941. Critical tests with phenothiazine as an anthelmintic in horses. *No. Am. Vet.* 22:2, pp. 85-92.

Effects of Injected Histamine[5]

Histamine in doses of 40mg of the base in 25cc of physiological saline solution, was injected into the jugular veins of three horses. Respiratory symptoms were induced which were indistinguishable from those associated with acute anaphylactic shock and, with the exception of coughing, characteristic of acute alveolar emphysema (heaves). Sweating and rapid evacuation of the bowels also occurred, as in anaphylaxis. Urination, a frequent occurrence in anaphylaxis, was not produced by the injections of histamine; on the other hand lacrymation, which is not a feature of anaphylactic shock, invariably accompanied the histamine injections.

* * * *

Sensitization and Periodic Ophthalmia[6]

Sensitization has been suggested as a possible cause of periodic ophthalmia in the horse. The prevalence of intestinal parasites in this species has led to the theory that there may be some relationship between parasites and periodic ophthalmia; possibly that some form of sensitization produced by parasites results in eye manifestations.

A series of experiments with rabbits indicated that this animal can be sensitized to the protein of the horse parasite *Strongylus* spp. When test injections were made in the eye of sensitized rabbits a local reaction followed, reaching its height in about six hours, after which an exudate formed and the inflammation gradually subsided. Control animals showed a similar reaction, but the changes were not so severe and did not appear until 48 to 72 hours after injection; they seemed to be associated with irritation and inflammation rather than with any specific sensitization.

The results of these experiments appear to warrant further investigation along this line.

[5] Andberg, William G., Willard L. Boyd, and Charles F. Code, 1941. Syndrome of temporary alveolar pulmonary emphysema (heaves) in the horse following intravenous injection of histamine. *J.A.V.M.A.* 98:769, pp. 285-287.

[6] Stubbs, E. L., and W. Graham Love, 1941. Studies on sensitization: its possible relationship to periodic ophthalmia. *No. Am. Vet.* 22:9, pp. 539-542.

Treatment of Horses Exposed to Chemical Warfare Agents[7]

Most chemical agents used in warfare act as lacrymators, irritant smokes, lung irritants, vesicants, or systemic poisons.

Lacrymators, causing irritation of the conjunctiva and lacrymal apparatus, produce a profuse flow of tears in man. Horses are much less susceptible, and are probably not affected by the concentrations usually obtainable in field conditions.

Irritant smokes in low concentrations may cause sneezing, coughing, lacrymation, headache, nausea, and temporary physical disability in man. Animals are less sensitive to them, and should not be affected in ordinary field concentrations.

Phosgene is the most important representative of the lung irritant group. In concentrated form, this agent causes such intense damage that the lung abruptly ceases to function and the shock also causes circulatory failure. Exposure to concentrations high enough to cause sudden death is unlikely to occur unless the animal is in the immediate neighborhood of a gas shell burst. Horses exposed to lower concentrations may appear to be in good condition for a few or even several hours after gassing; then exhibit symptoms of cyanosis, collapse, and die. The first and most important procedure in the treatment of animals gassed with lung irritants is evacuation to uncontaminated areas. This should be done in such a manner as to avoid undue exertion, by removing pack, harness, etc., and evacuating at a slow walk. The animal should be kept warm and quiet. Among the first of the curative measures is early venesection, blood in amounts of 0.5 to 1% of the body weight being drawn. If the amount of hemoglobin in the blood begins to increase, venesection should be repeated as often as necessary, withdrawing smaller amounts. It may be necessary to administer oxygen to relieve the anoxemia. Nonalcoholic stimulants are indicated and expectorants may be used advantageously. Morphine and respiratory depressants are contraindicated. Should complications arise,

[7] Mace, Don L., 1941. Animal casualties from chemical warfare agents. *Army Vet. Bul.* 35:2, pp. 86-95.

treatment should be modified to cope with individual symptoms.

Mustard gas is the most common vesicant agent used in warfare. Its vapor is also a powerful lung irritant, but under field conditions mustard injuries of the respiratory tract of horses are rare. When they do occur, treatment is symptomatic. The chief action of mustard gas is on the skin. The skin of the horse is about as sensitive as that of man; the hairless portions are probably more so. The success of any treatment depends upon the speed with which it is used after exposure; the longer treatment is delayed, the more severe the injury will be. In treating contaminated animals the attendants must wear respirators and protective clothing. Where contamination is widespread and not accurately defined, the animal should be completely and vigorously scrubbed with soap and warm water. The skin may be thoroughly scrubbed with a paste made of freshly prepared bleach powder (chlorinated lime) and water. This paste is irritant and should be removed by flushing with water after not more than five minutes. Where contamination is local and clearly defined, the drops should be removed mechanically with cotton, wool, waste or rags, care being taken not to spread the liquid to the surrounding parts. It may be advantageous to swab these areas with gasoline or kerosene. Treatment with bleach should then be undertaken. Gas-cauterized areas can be treated with Dakin's solution to prevent secondary infection. When the eyes are affected, treatment should consist of irrigations with lukewarm aqueous solutions of sodium bicarbonate. Cod-liver oil or bland lubricants may be applied to the cornea and lids. The eyes should not be bandaged, and light should be avoided. Treatment of injuries to the digestive tract through swallowing contaminated forage and water should be symptomatic.

Lewisite lesions are more severe than those from mustard gas, and there is in addition a systemic effect from absorption of arsenic.

Phosphorus burns are treated by excluding air from the affected parts.

Horse gas masks and horse boots to protect the hoof and lower leg have been used to some extent. Stables and veterinary hospitals should be so placed as to eliminate as far as possible exposure to gas attacks, and valleys and ravines should be avoided in selecting sites. Animals should be prevented from pasturing in localities or drinking from water holes in areas which have been recently contaminated with gas. All foodstuffs and all water for drinking purposes should be carefully protected from contamination by these chemical agents.

See also in VETERINARY MEDICINE:

February
Anthrax in Horses....p. 95
Interstitial Emphysema in a Horse....p. 109
Carcinoma of the Parotid in a Saddle Mare....p. 110

March
Treatment of Mange in the Horse....p. 138
Abdominal Rupture in a Gelding from Goring....p. 171

April
Phenothiazine as an Equine Anthelmintic....p. 188
Simplifying the Umbilical Hernia Operation....p. 222
Removal of Dentigerous Cysts....p. 224

May
Occurrence and Cause of an Auricular Sound in the Horse....p. 250
Complications Following Nail Prick....p. 258

June
Chemotherapeutic Studies of Infectious Anemia of Horses....p. 306
Sporotrichosis in a Jack....p. 321
Blood Transfusion in Horses....p. 327
Treatment of Chronically Lame Horses by Alcoholization....p. 327
Ovariotomy in Mares....p. 328

July
Experiences of a General Practitioner.p. 348
Calcium and Phosphorus Deficiency in a Colt....p. 378

August
History and Distribution of Equine Infectious Anemia in the United States.p. 410
Phenothiazine Poisoning....p. 430

September
Equine Abortion and Diseases of Foals.p. 452
Malignant Edema in a Colt....p. 469
Effects of Phenothiazine on the Equine Blood Picture....p. 481

October
Intravenous Chloral Anesthesia in Horses....p. 500

November
Experiments with Phenothiazine in the Treatment of Horses for Strongyles.p. 557

Cattle

Developments in the Therapy of Shipping Fever in Cattle[8]

The incidence of shipping fever among feeder cattle has increased. The chief factor in this increase is probably that the demand for smaller cuts of beef has changed the usual feeding of two- and three-year-old steers to that of steer calves and young heifers, more susceptible to disease and less able to withstand the hardships of shipping.

Shipping fever is not necessarily "hemorrhagic septicemia." The latter disease is caused by Pasteurella organisms, the presence of which should be confirmed in the laboratory before the diagnosis is accepted. Actually, in the authors' section of the country (Colorado), Pasteurella is the rare exception in cases of shipping fever; the bacteria observed have included diphtheroids, streptococci, and staphylococci, and some cases have been negative. The usual hemorrhagic septicemia aggressins and bacterins and anti-hemorrhagic septicemia sera are therefore practically useless in the prophylaxis and treatment of shipping fever in this section.

Vaccination of any sort immediately prior to or immediately following shipping or at stockyards is likely to do more harm than good. If done 10 days before shipment from the range, or at the feedlot after a period of rest and adjustment to the new quarters and feed, vaccination with mixed pulmonary bacterin is of value in reducing the incidence of shipping fever.

For treatment, various drugs and chemicals have been tried by the authors; some have been of use and some have not. Sulfanilamide and sulfapyridine, which have been highly recommended as therapeutic agents in shipping fever, have given negative results in the non-Pasteurella type which prevails in Colorado.

The best results have been obtained from the intravenous administration of potassium guaiacol sulfonate. Since guaiacol (a phenol ester) is insoluble in water, the derivative is first suspended in ethyl alcohol, then dissolved in an aqueous solution of sodium iodide, in these proportions:

Potassium guaiacol sulfonate	5gm
Ethyl alcohol, 95%	10gm
Sodium iodide	5gm
Sterile water	90gm

This solution is stable, and can be kept for months in a dark bottle before the guaiacol precipitates. The dose is 75cc for calves weighing 300 lbs. or less; 125cc for those weighing 400 to 600 lbs.; 150cc for larger cattle. It should be given intravenously, since guaiacol is irritant when given hypodermically. Cases which do not respond should be retreated in 48 hours.

When guaiacol is used in the early stages, there is practically 100% recovery from uncomplicated shipping fever; the temperature drops two to three degrees in 24 hours, and the animal is often back on feed in 36 to 48 hours. Where bronchopneumonia develops, the results from the treatment are less encouraging. In some cases of shipping fever there is a "necrophorus" infection of the liver; this complication is invariably fatal.

[8] Johnson, H. W., and James Farquharson, 1941. Newer developments in the therapy of shipping fever in cattle. *J.A.V.M.A.* 99:773, pp. 103-106.

A Simple Field Test for Mastitis[9]

One of the principal objects of mastitis research has been the origination and development of diagnostic methods for field use that would possess both simplicity and accuracy. Many proposed tests have to some extent embodied these characteristics, but usually simplicity is gained at the expense of accuracy or accuracy at the expense of simplicity.

The modified Whiteside test, while of course not comparable with bacteriological tests, appears to yield better results than many of the commonly used field tests, and is simpler than some. It parallels closely the leucocyte count in ability to detect the presence of udder infection, and should be of value in field use as a simple, relatively accurate, presumptive test for the presence of chronic bovine mastitis.

The technic is as follows: A small amount (1 to 5cc) of foremilk is drawn from each quarter into a clean test tube. The test is performed on a piece of window glass, the size of which depends on the preference of the operator. An area about two inches square is needed for each test; the larger the glass, the more tests that can be performed without the need for washing and drying it.

One drop of N. NaOH and five drops of milk are mixed with a glass rod for about 20 seconds, using a dull green blotter as a background for the glass plate and reflected light as the source of illumination. One medicine dropper is used for the milk and one for the NaOH solution; care should be taken that the drops delivered by each are approximately the same size. All milk should be expelled from the milk dropper before proceeding to the next sample, and it should be rinsed with this milk before removing the test amount.

The test mixture is examined for a precipitate. It may be graded roughly into six divisions: A 4+ reaction is characterized by a thick, viscid mass that does not readily break up. A 3+ reaction at first forms a viscid mass and then breaks up into a slightly opaque fluid and a precipitate composed of large particles or a solid scum-like mass. In a 2+ reaction the precipitate is composed of smaller particles; it tends to clump but does not form a mass or scum as in the 3+ reaction. In a 1+ reaction the precipitate is composed of small particles which are usually dispersed through the mixture but which may show a tendency to clump. A slight reaction (±) yields a precipitate so slight and so fine as to be easily overlooked. To be classified as negative, a sample should be entirely free of precipitate.

[9] Murphy, James M., and John J. Hanson, 1941. A modified Whiteside test for the detection of chronic bovine mastitis. *Cor. Vet.* 31:1, pp. 47-55.

Acriflavine Therapy for Streptococcic Mastitis[10]

The udder tissues of cows have a capacity for retaining infused aqueous solutions, in an amount varying considerably with individual quarters. Since the amount retained influences both the efficiency of the treatment and the degree of irritation to the tissue, the results obtained with aqueous solutions of trypaflavin (acriflavine) are uneven, although this drug has a relatively high degree of efficiency in connection with infusion therapy of streptococcic mastitis.

[10] Schalm, O. W., 1941. The use of trypaflavin in the infusion therapy for streptococcic mastitis. *Am. Jnl. Vet. Res.* 2:2, pp. 117-126.

Although not so serious a threat to animal and human health as tuberculosis or brucellosis, bovine mastitis causes a decided reduction in a country's milk supply. The need for an effective method of controlling this disease has led to considerable research on various products with varied technics. Infusion with acriflavine, gramicidin, or novoxil has shown much promise as an economical control measure.

By using a hypertonic (20%) sugar solution as a vehicle for the trypaflavin, it is possible to milk out all or most of the fluid infused, since the sugar holds the fluid in the duct and cistern spaces and thus prevents its absorption by the tissues. This makes it possible to use a much greater concentration of trypaflavin without damaging the udder tissues, increasing the efficiency of the treatment and producing more uniform results.

Schalm's modification of the technic described by Steck is as follows: 200cc of infusion fluid is injected into the milked-out quarter as a preliminary rinse and, after a short, light massage, this is milked out and replaced by 400cc of principal infusion, left in for five minutes. Both infusions are milked out into a graduated container and the milking is continued until a total of 600cc is regained or no more fluid is obtainable. When a large number of quarters are treated, it is convenient to use milk bottles marked at the 600cc level into which to milk the infused fluid.

The amount of infusion fluid used depends on the size of the udder. The 400cc principal infusion is suitable for small to medium-sized udders. For medium-sized to large udders, the principal infusion may need to be increased to 600 or even 800cc. It is important to fill the cistern region completely with the fluid.

The fluid (representing a 1:1,500 concentration of trypaflavin) is prepared as follows: 0.4gm of trypaflavin is dissolved in 450cc of boiled, filtered tap water, after which 150cc of highly concentrated sugar solution is added to bring the total volume to 600cc, the amount sufficient for treatment of one quarter (that is, where the quarter is small, as indicated above). The sugar solution is prepared in advance by dissolving the sugar in hot water in the ratio of 120gm of household sugar in water sufficient to give a volume of 150cc of solution. Several liters of stock solution can be prepared at one time and bottled in amounts sufficient for treatment of one, four or more quarters. After bottling, the sugar solution is placed in a steam bath, at a temperature of 100°C., for one-half hour.

Using this method, Schalm treated 55 infected quarters of 32 cows; 30 of the animals were lactating and two dry. *S. agalactiae* was eliminated from 38 quarters by one infusion; from 12 by two infusions; and from one by three infusions. Four quarters were not cured by three infusions, and the two animals involved were removed from the herd as incurable. No injury was observed as a result of the treatment, except a transient effect in eight quarters; these were all either small or partially atrophied before treatment, and the infusion fluid had distended them quite tensely. It would seem advisable to lessen the volume of the principal infusion in treating that type of quarter.

S. agalactiae was apparently eradicated from this herd within a period of three months by intensive treatment of all infected quarters and removal of the few animals not responding to treatment. The same end accomplished by a program of segregation and elimination of infected cows would require many months.

Use of Gramicidin and Other Agents in Chronic Mastitis[11, 12]

In a herd of 116 cows, 16 were infected with *S. agalactiae,* a total of 32 quarters being involved. Following chemotherapeutic treatment, the streptococci were eliminated from 12 animals, thus necessitating the disposal of only four cows to eradicate the infection.

Twenty-eight of the 32 infected quarters were treated with gramicidin; of these 23 were sterilized (14 in a single treatment, nine requiring further treatment). Ten quarters were treated with novoxil, the streptococci being eliminated from five; a single injection was sufficient in two quarters, the others required two or three.

In another study, 53 quarters of 21 cows were treated with gramicidin, novoxil, or acriflavine. *S. agalactiae* was destroyed in

[11] Little, R. B., R. J. Dubos, R. D. Hotchkiss, C. W. Bean, and W. T. Miller, 1941. The use of gramicidin and other agents for the elimination of the chronic form of bovine mastitis. *Am. Jnl. Vet. Res.* 2:4, pp. 305-312.

[12] Little, R. B., R. J. Dubos, and R. D. Hotchkiss, 1941. Gramicidin, novoxil, and acriflavine for the treatment of the chronic form of streptococcic mastitis. *J.A.V.M.A.* 98:768, pp. 189-199.

34 of the quarters. Of the 53 quarters, 32 were treated with gramicidin, and the streptococci were eliminated from 21 (11 on a single treatment, 10 requiring additional treatment). Seventeen quarters were treated with novoxil, and the streptococci were eliminated from 10. Of seven quarters treated with acriflavine, the streptococci were eliminated from three. [Note: Infusion of aqueous solutions of acriflavine, in 1:10,000 or 1:4,000 concentrations, was used, so that these results are not comparable with those of Schalm (*supra*). No satisfactory combination of acriflavine with oil was worked out.]

Gramicidin is considered as showing much promise in mastitis therapy. The best results were obtained by injecting 20 to 80mg of gramicidin suspended in 25 to 50cc of heavy mineral oil. The reaction to this mixture was so mild that it was possible to repeat the treatment on the second or third day; in some cases on as many as four consecutive days.

Gramicidin is an alcohol-soluble, water-insoluble substance isolated from cultures of an aerobic sporulating bacillus. The stock solution used in these trials contained either 20 or 40mg of the substance per 1cc of 95% alcohol. The following technic was finally adopted: 20 to 160mg of the gramicidin in alcoholic solution (1 to 4cc of solution) was diluted with 15cc of doubly distilled water to which 25 to 50cc of sterile mineral oil was added. After the solution of gramicidin in water and oil had been partially mixed in the bottle by gentle agitation, a more suitable suspension for the injection was obtained by repeatedly drawing the mixture back and forth into the syringe until it became milky in appearance and less viscid.

The injections were made following the morning milking and the teats were cleansed in the following manner: The meatus of the teat was gently washed with absorbent cotton dampened with warm, soapy water, rinsed with warm water, and dried. A pledget of cotton saturated with 68% alcohol was then applied to the distal portion of the teat and held there until the injection was made.

The injection was made with a sterile milking tube having a blunt closed end and a small rubber tube about 1½ inches in length attached at the open end. The tip of the milking tube was dipped into lubricating jelly. Before the injection the residual milk from the teat sinus and milk cistern was drained out by passing the tube back and forth from the end of the teat into the cistern. The rubber tubing attached to the milking tube made a tight connection with the needle attachment on the 50cc Luer syringe. The gramicidin-oil mixture was injected slowly into the cistern, special care being taken to distribute it in different portions of the cistern. After removal of the tube the quarter was gently massaged, and was milked out eight or nine hours later. Some cows had extremely patent teat sphincters which could not retain the fluid. This condition was corrected by applying adhesive bandages to the end of the teat.

Since the gramicidin-oil mixture is not a stable suspension, the watery solution is released upon reaching the cistern. Apparently the oil counteracts much of the irritation which might be caused by the injection of gramicidin in aqueous media; it may also itself temporarily inhibit the development of the streptococci.

It seems that the treatment of bovine mastitis should be concentrated on an attempt to sterilize the cistern rather than to infuse the entire quarter. However, in cases where the streptococci are not eliminated by two treatments, or by daily injections of small amounts of the gramicidin-oil mixture, it may be of advantage to utilize large volumes of dilute aqueous solution of gramicidin—always keeping in mind the danger of tissue damage following too extensive treatment.

Using the gramicidin-oil treatment, the animals were out of production for only a short period, and the treatment apparently had little effect on the subsequent milk yield. Another factor of importance in evaluating a chemotherapeutic agent is the length of time it may render the milk unfit for human consumption; in this connection it is of interest that gramicidin does not appear to elicit any toxic reaction when administered orally.

Novoxil Treatment of Str. Agalactiae Infections[13]

Twenty-three cows with 67 quarters infected with *S. agalactiae* received injections of novoxil liquid (a colloidal dispersion of silver oxide in a light mineral oil) in the infected quarters. Ten of these cows showed clinical symptoms of catarrhal (chronic) mastitis in 19 of the infected quarters.

Novoxil liquid containing 2.5, 3, 5, and 10% silver oxide was injected into different udder quarters. Five to 20cc of the same concentration was injected one to 10 times at intervals of 12, 24, 48 and 72 hours. All but eight of the cows received a single course of treatment while in milk. Five were given repeated courses of treatment while in milk and three received a single injection during the "dry" period.

The *S. agalactiae* infection was destroyed in 59, or 88.1%, of the infected quarters. The infection was destroyed in all infected quarters in 19, or 82.7%, of the cows treated.

Ten (52.6%) of the quarters and five (50%) of the cows showing clinical symptoms of catarrhal mastitis recovered from the symptoms and the infection was destroyed.

The results were satisfactory in the few cows treated with the 2.5 and 3% concentrations, but the reaction of the udder was not much greater with the 5% concentration, and the latter was used in most cases.

Injections at 24-hour intervals appeared to be more effective than at 72-hour intervals, and three to five injections were more effective than a lesser number.

Swelling of the udder and a change in the appearance of the secretion occurred in all cases following the injections, but these changes were only temporary.

The greater quantity of the silver injected into a quarter was eliminated in about five days following the last injection, but traces were present in the milk for periods ranging from 36 to 121 days in the eight cows whose milk was tested in this respect.

[13] Klein, Louis A., Albert L. Kleckner, and Robert O. Biltz, 1941. Effect of novoxil liquid on catarrhal (chronic) mastitis and on *Streptococcus agalactiae* udder infection. *Am. Jnl. Vet. Res.* 2:3, pp. 145-151.

Disinfection of Teat Cups[14]

It has been suggested that the teat cup of the milking machine may be a factor in the spread of mastitis, and this study was undertaken to determine whether this is true, and if so, what the most efficient method of disinfecting the teat cups is.

Experiments were carried out on 65 machine-milked cows on a farm where mastitis had increased steadily during the past eight months. The data suggested that unless the teat cups are properly cleaned and sterilized, they may serve as an important factor in the spread of mastitis.

Rinsing the cups in chlorine solution, or in clear water followed by chlorine solution, proved inadequate in removing *S. agalactiae* completely. The most efficient method of sterilization was found to be treatment with live steam for 30 seconds immediately after milking each animal, then rinsing in chlorine solution. The chlorine solution should be renewed at frequent intervals.

* * * *

Treatment of Acetonemia[15]

The authors of this paper prefer to accept the viewpoint that ketosis in cows and ewes is due primarily to a disturbance in carbohydrate-fat metabolism and that it is indirectly due to an inadequate consumption of readily available carbohydrate or carbohydrate-forming food. It is granted that other contributing factors may be involved, *e.g.*, some dysfunction of certain endocrine glands, notably the pituitary, but it appears to the writers that the fundamental aspects of the etiology have been established.

The safest and most rational form of therapy for ketosis in the ruminant seems to be the liberal administration of dextrose or similar carbohydrate; there is little evidence to support the use of insulin, sodium bicarbonate, magnesium sulphate, or calcium gluconate. Calcium gluconate is indicated when ketosis is complicated by milk

[14] Hay, James R., 1941. The bacterial flora and disinfection of teat cups. *Am. Jnl. Vet. Res.* 2:4, pp. 297-304.

[15] Sampson, Jesse, and L. E. Boley, 1941. The physiological basis of therapy for ketosis in the ruminant. *Am. Jnl. Vet. Res.* 2:4, pp. 327-332.

fever. Chloral hydrate therapy may be beneficial for ketosis in cows, but it should not be employed when the animal is in a weakened condition or is affected with both ketosis and milk fever. Further observations are desirable to determine the usefulness of anterior pituitary hormone for acetonemia in the cow.

Carbohydrate therapy in the ruminant is most effective when treatment is begun in the early stage of the attack and intravenous and subcutaneous injections of dextrose solution are supplemented by large oral doses of sugar or molasses.

Diagnosis of Bovine Pseudorabies (Mad Itch)[16]

It seems likely that pseudorabies ("mad itch," infectious bulbar paralysis, Aujeszky's disease) occurs more commonly among cattle in the United States than the relatively infrequent reports of it might indicate; it is suspected that many outbreaks are erroneously diagnosed. It has been definitely recognized in Iowa and in Illinois. These field and laboratory observations on a spontaneous outbreak in Illinois are reported with a view to assisting the clinician in recognizing and suppressing it.

The epizootiological features of this and other outbreaks point strongly to apparently healthy swine as carriers of the virus. Rats may also play a part.

Seven animals in a herd of steers showed similar symptoms, the disease developing rapidly and terminating fatally in 24 to 48 hours. One steer (a Hereford weighing about 1000 lbs.) was brought to the laboratory for observation about eight hours after symptoms developed. At that time there was a slightly increased rate of respiration, frequent licking and biting of the skin behind the left shoulder and over the left foreribs, and occasional spasms of the diaphragm. The rectal temperature was 103°F. The following morning the respirations had increased to 138 per minute. At 3:30 p.m. the temperature was 107.8°F. and the respirations 145 per minute and shallow; the animal showed a disposition to lie down on the right side. At 5:30 p.m. the temperature was 109°F., a bloody froth was observed about the mouth and nostrils, and spasms of the diaphragm occurred as often as five or six times a minute. The animal was destroyed for autopsy at 7:30 p.m.

Blood examinations made at intervals after the steer was brought to the laboratory showed no significant variation from the normal aside from a hyperglycemia, the significance of which was not clear. At necropsy no significant lesions were observed aside from a mild pulmonary edema and the lesions along the left side and back resulting from the animal's biting and licking.

Experimental inoculation of rabbits and guinea pigs with blood, brain suspension, and urine from the steer produced no reactions. Suspensions of spinal cord produced in rabbits symptoms consisting of biting and scratching at the point of inoculation, increase in the respiration rate to about twice the normal number, and death within approximately 80 to 86 hours. At necropsy, marked congestion and edema of the lungs were constant lesions.

The presence of the virus was demonstrated in a bacteria-free filtrate (Berkfeld N) of the steer's spinal cord and in a similar filtrate from the spinal cord of rabbits dying from the disease. A calf inoculated subcutaneously with a filtrate prepared from a composite suspension of the steer and rabbit spinal cords showed symptoms paralleling those of the original steer.

Lesions were produced on the chorioallantois of the developing chick embryo by inoculating heavily with virus-containing material after 12 days of incubation. The lesions were similar to those previously described by Glover in cultivating the virus of Aujeszky's disease.

On the basis of these results, the attention of the clinician is called to the desirability of providing a live affected animal for laboratory diagnosis in cases where symptoms similar to those described appear in a herd of cattle; and removing all swine, even though apparently healthy, from contact with the cattle, as a control measure.

[16] Morrill, C. C., and Robert Graham, 1941. An outbreak of bovine pseudorabies. *Am. Jnl. Vet. Res.* 2:2, pp. 35-40.

Johne's Disease and the Tuberculin Test[17]

Three herds consisting of 347 cattle were tested with both johnin and tuberculin. Of the 24 animals reacting to the johnin test, nine reacted to the tuberculin test also. None of the johnin-negative cattle reacted to the tuberculin test.

On necropsy no lesions of tuberculosis were found in any of the nine animals reacting to both tests. All nine had lesions considered typical of Johne's disease, and acid-fast organisms indistinguishable from *Mycobacterium paratuberculosis* were found in stained smears from the intestinal mucosa of eight of these.

It is concluded that Johne's disease may cause a tuberculin sensitization which results in "no visible lesion" post-mortem reports.

Hereditary Transmission of Anaplasmosis in Ticks[18]

Hereditary transmission of Anaplasma bodies from an adult female tick (*Dermacentor andersoni*) to her progeny was successfully demonstrated for the first time, the larvae transmitting the disease to a susceptible cow. It has been considered that this tick is of little importance in spreading anaplasmosis, since the immature stages seldom feed on cattle. However, *D. andersoni* is the only proved vector found in large numbers in much of the area in which anaplasmosis occurs; and it is possible that the factor of hereditary transmission may be of importance in the spread of the disease.

An interesting feature of this case is that the adult tick which transmitted the disease to her progeny was infected by feeding on an animal just beginning to show clinical symptoms of anaplasmosis. The possibility that *D. andersoni* can be infected most readily by feeding on animals in the initial stage of the disease is being investigated further.

Mosquitoes and Anaplasmosis[19]

Experiments indicate that mosquitoes may transfer anaplasmosis from sick to healthy animals, but it is likely that large numbers are required and that conditions must be favorable. Psorophora appear to be the mosquitoes of most importance in anaplasmosis transmission; but probably none are important factors in the spread of this disease.

Horseflies and Anaplasmosis[20]

In previous experiments with horseflies as possible vectors of bovine anaplasmosis, transmission has sometimes been accomplished and sometimes not. In this experiment, under carefully controlled conditions three susceptible bovine animals developed anaplasmosis 24 to 28 days after being bitten by the horsefly *Tabanus sulcifrons*, which had previously been allowed to feed on an infected bull.

The success of this experimental transmission where some previous attempts have failed calls attention to three features which may have a bearing on insect transmission of this disease. (1) The time factor; only a few seconds elapsed between the time the horsefly was removed from the infected animal and the time it began feeding on the susceptible one. (2) The number of bites; these animals were bitten 73, 69, and 74 times, respectively, by horseflies removed from the infected bull. (3) The stage of the disease in the source animal; two of the animals were bitten before the source animal developed clinical symptoms of the disease, and the third shortly thereafter. [In this connection note the observation of Howell, Stiles and Moe (*supra*) regarding the possibility that *D. andersoni* can be infected most readily by feeding on animals in the initial state of the disease.]

[17] Johnson, H. W., J. G. Milligan and B. F. Cox, 1941. Tuberculin reactions in cattle infected with *Mycobacterium paratuberculosis* (Johne's disease). *J.A.V.M.A.*, 99:773, pp. 115-117.

[18] Howell, D. E., Geo. W. Stiles, and Lewis H. Moe, 1941. The hereditary transmission of anaplasmosis by *Dermacentor andersoni* Stiles. *Am. Jnl. Vet. Res.* 2:3, pp. 165-166.

[19] Howell, D. E., Geo. W. Stiles, and Lewis H. Moe, 1941. The transmission of anaplasmosis by mosquitoes (Culicidae). *J.A.V.M.A.* 99:773, pp. 107-110.

[20] Lotze, John C., and Marvin J. Yiengst, 1941. Mechanical transmission of bovine anaplasmosis by the horsefly *Tabanus sulcifrons* (Macquart). *Am. Jnl. Vet. Res.* 2:4, pp. 323-326.

The Rocky Mountain Wood Tick and Tick Borne Diseases[21]

Dermacentor andersoni Stiles (Rocky Mountain wood tick, spotted fever tick, sage tick, paralysis tick) is the most injurious tick on the western part of the North American continent because of its role in the transmission of disease. The infections which it is known to transmit include Rocky Mountain spotted fever, tularemia, anaplasmosis, and a filter-passing, rickettsia-like agent, thought to be related to the rickettsia of so-called "Q fever" in Australia.

This tick, a member of the family Ixodidae, bears a close resemblance to *Dermacentor albipictus* Packard (elk tick, winter tick) and to *Dermacentor variabilis* Say (American dog tick), and for positive identification microscopic study is necessary.

One method of tick control is dipping the stock three times at 10-day intervals, commencing as soon as the ticks appear in the spring. A dip that has been found satisfactory is made up of sal soda crystals, 24 pounds; white arsenic, eight pounds; pine tar oil, one gallon; water, 500 gallons.

In small herds, hand treating or spraying can be done satisfactorily. A useful mixture for hand treatment is made up of creosote one part, coal oil two parts and raw linseed oil one part. Another dressing which the author has found to be excellent is prepared as follows: heat one gallon of raw linseed oil, eight ounces of oil of tar and two pounds of sulphur in a double boiler, stirring frequently. This mixture should be heated for 1½ hours over a low fire and brushed on the animals while hot, applying it to the legs, belly, breast and throat. Adhering firmly to the hair, this mixture kills the ticks present and prevents others from attacking the animals.

A direct and effective attack against the ticks can be made by breaking their cycle of development through the destruction of gophers, rabbits, and other small animals, which are necessary as hosts for the young ticks.

[21] Davidson, W. B., 1941. The Rocky Mountain wood tick and tick borne diseases. *Can. Jnl. Comp. Med.* 5:5, pp. 123-137.

Probably the most important disease transmitted by the tick is Rocky Mountain spotted fever. A prophylactic vaccine against this disease is available for human beings.

Tularemia, which is primarily a specific bacterial infection of small mammals, may be transmitted to man, and the wood tick plays an important role in such transmission. No specific preventive or curative treatment has been developed. This disease has also appeared in sheep, in a section where wood ticks and their small animal hosts had become unusually abundant. The symptoms exhibited by sheep are: depression, increase in the respiration rate, elevation of temperature, sometimes to 107°F. The head may be held low or elevated above the normal level. Diarrhea is frequently noted. An increasing stiffness of the gait and a straddle-legged, hunched appearance of the hind quarters may be seen. In the later stages there is labored breathing, often accompanied by grunting, groaning, and grinding of the teeth. Severe cases result in complete prostration followed in a few hours by death.

Anaplasmosis may be transmitted by *D. andersoni*, as well as by several other species of ticks.

A virus closely resembling, and thought to be related to, *Rickettsia diaporica*, the causative organism of "Q fever" in Australia, has been isolated from naturally infected *D. andersoni*. That this virus may produce disease in man was made apparent through the accidental infection of a laboratory worker.

Tick paralysis may result from the attack of adult female ticks *per se*. The exact cause of the paralysis is not known, but there appears to be a definite correlation between the speed of engorgement and the onset of paralysis. Early symptoms in man include lack of coordination, manifested by a weaving, staggering gait. Reflexes are lost but sensation is unaffected. Weakness and nervousness are commonly noted. The condition progresses rapidly, involving the throat and respiratory muscles, with resulting difficulty in speaking, hurried, labored breathing, and acceleration of the pulse. Vertigo, convulsions and vomiting

are seen in some cases. Swelling and protrusion of the tongue takes place, followed by death from respiratory paralysis, usually in from three to five days. Adults are more resistant than children, the paralysis tending to be localized. On removal of the ticks improvement commonly follows in 30 to 60 minutes and complete recovery in one to five days.

Tick paralysis has been observed in cattle, horses, sheep and dogs. Immediate removal of the ticks is usually followed by recovery.

The Pharmacology of Sulfapyridine in Cattle[22]

Experiments were carried out to determine (1) the quantity of sulfapyridine that could be administered to cattle without toxic effects, (2) the time required to attain a concentration in the blood adequate for therapeutic effect, and (3) how frequently the drug would have to be administered to maintain this level with the least fluctuation.

Undesirable effects, including loss of appetite, constipation and decrease in milk production, were observed in all of the cows from all the doses administered, but these conditions disappeared in a day or two after the last dose was given. No other toxic symptoms were observed, aside from urticaria-like swellings in the skin in one of the six cows tested. There was no effect on the red cells or hemoglobin content of the blood. The total white cell count increased in all but one cow. The percentage of lymphocytes decreased while the percentage of neutrophils increased.

On a daily dose of 4gm per 100 lbs. of body weight for 48 hours, a blood concentration of free sulfapyridine within the level of 3 to 6mg per 100cc of blood (the concentration found therapeutically effective in man), was attained in 12 to 34 hours after the initial dose was given. A maximum concentration of 3.6 to 4.2mg was attained in 32 to 44 hours.

When daily doses of 5 and 6gm per 100 lbs. of body weight were administered for six days, the free sulfapyridine in the blood reached the 3 to 6mg level in 12 to 26 hours. The blood concentration continued to increase until the middle of the sixth day, when a maximum of 11.6 to 13mg was attained, indicating that the drug is accumulative.

On daily doses of 7, 8, and 9gm per 100 lbs. of body weight administered for six days, the 3 to 6mg level was reached in 9 to 38 hours. The cow on the 9gm dosage attained a maximum blood level of 14.4mg on the fifth day; the maximum of the cows on the 7 and 8gm dosage was no higher than that of cows on the 5 and 6gm dosage. The concentration of free sulfapyridine in the milk of the cows on the 7, 8 and 9gm dosage was found to be 1.8, 1.2, and 3.7mg lower, respectively, than in the blood.

The various daily doses were administered in fractional doses on different schedules. The sulfapyridine blood level rose most rapidly the first day when the daily dose was given in four fractions at intervals of four hours, but also had the greatest drop in the interval between the doses. There was less fluctuation of the sulfapyridine level when the daily dose was given in five fractions at four-hour intervals or in three fractions at intervals of eight hours.

Yeast in the Treatment of Trichostrongylosis in Calves[23]

Although several efficient anthelmintics have been developed for gastrointestinal worm parasitisms in calves, it is still necessary to give a guarded prognosis in outbreaks occurring in the winter because of the additional hazards involved, such as insufficient exposure to the sun, lack of proper exercise, poor quality hay and grain, and, frequently, heavy infestations of lice or other external parasites. A possible solution of one of these difficulties is suggested by the results of this study.

The two weakest calves from a heavily-parasitized group, which the farmer had intended to destroy because they were too

[22] Klein, Louis A., Albert L. Kleckner, and Robert O. Biltz, 1941. Sulfapyridine in cattle; a contribution to its pharmacology. *Am. Jnl. Vet. Res.* 2:4, pp. 333-339.

[23] Baker, Donald W., 1941. Yeast as an adjunct to the anthelmintic treatment of advanced cases of trichostrongylosis in calves. *Cor. Vet.* 31:1, pp. 13-16.

weak for anthelmintic treatment, were fed dried yeast to stimulate their appetite. Both gained weight, became stronger, and by the 16th day were able to tolerate a dose of 30cc of a 50-50 mixture of tetrachlorethylene and mineral oil, preceded by an oral swabbing with a 5% copper sulphate solution. This was repeated on the 25th day. The yeast was continued; they continued to improve in condition; and by the 60th day, when they were returned to the farm, they were in much better condition than the other calves of the group, which had been treated with copper sulphate solution and tetrachlorethylene, and subsequently received good feed.

The yeast was given as follows: at first, when there was almost complete anorexia, a suspension of one-half pound of dried yeast in about two quarts of water was given through a stomach tube. The next two days, each calf was given one pound of the dried yeast per day in half-pound lots, morning and night. The yeast was soaked for a few minutes before feeding, and they ate it ravenously. On the fourth day, one-quarter pound of fitting ration was added to the morning feed and three-eighths of a pound to the evening feed. The proportion of grain to yeast was gradually increased, and finally adjusted at one-half pound yeast to one-half pound grain. They also consumed alfalfa hay and sliced carrots.

Twice, once before anthelmintic treatment and once after, the yeast was withheld for two days. Both times the appetite diminished immediately and the amount of grain, hay, and carrots consumed was markedly reduced, though less severely following treatment than before. When the yeast was resumed, the appetite returned. By the 50th day it was possible to discontinue the yeast with no loss of appetite.

Except in those circumstances where the parasitized animal would probably die without an heroic form of intervention, it is not advisable to give any form of anthelmintic when the patient is in an advanced state of malnutrition and debility. The methods used in this case have been repeated on a group of purebred Jersey yearlings, with equally satisfactory results.

Deficient Rations in Cows[24]

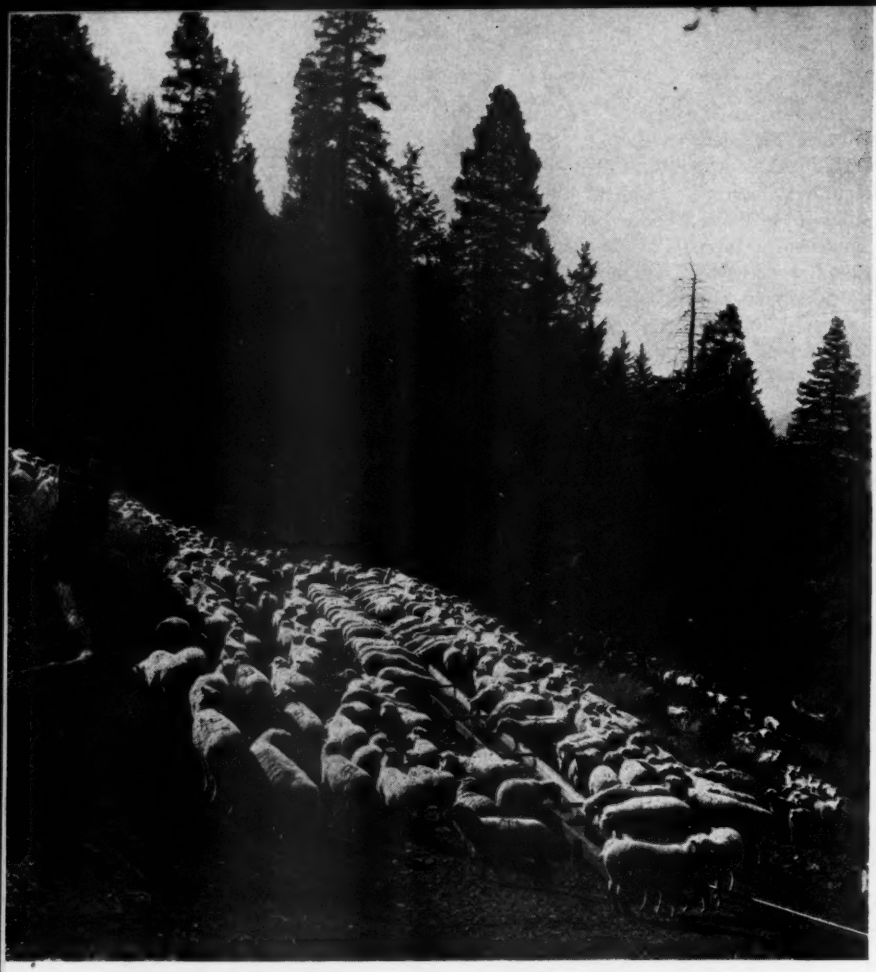
Eight cows fed from calfhood on a ration low in phosphorus and protein (prairie hay, beet pulp, and small amounts of corn and oats), remained subnormal physically. Ovulation was regular, but the signs of estrum were feebly expressed and sometimes absent. Seven of the eight animals conceived at first service, but one aborted at five months, one had difficulty at parturition, and in two the calves suffocated during delivery.

* * * *

See also in VETERINARY MEDICINE:

February
Gangrenous Mastitis .....p. 109
The Etiology of Pyometra in Cattle....p. 118
White Snakeroot Poisoning in Arkansas.p. 136
March
Diaphragmatic Hernia in a Cow.....p. 172
Dystocia from Occlusion of the Vagina..p. 172
April
Cooperative Plans for the Control of Bovine Brucellosis in Canada.....p. 184
Rupture of the Omasum.....p. 187
Bovine Coccidiosis Treated with Sulfanilamide .....p. 199
Agalorrhea in a Heifer.....p. 225
May
"Hard to Settle" Cows Respond to Vitamin C Injections.....p. 236
A Practitioner's Experience with Milk Fever .....p. 266
Epsom Salt Poisoning in Cows.....p. 273
June
Phenothiazine as an Anthelmintic for Cattle under Field Conditions.....p. 312
Whole Blood for Anaplasmosis.....p. 316
Sodium Chlorate Poisoning in Cattle..p. 318
Tibial Fractures in Cattle.....p. 320
July
Experiences of a General Practitioner..p. 348
August
Lymphoblastoma in Dairy Cattle.....p. 406
The Microscopic Detection of Bacterial Defects of Milk.....p. 415
Injuries to Cattle Caused by Starlings.p. 432
October
Paraplegia (Wobbles) in Cattle.....p. 507
Anaplasmosis in Cattle Following Dehorning .....p. 527
November
Difficult Calving .....p. 560
Acetonemia in Cattle.....p. 569
Bovine Hemoglobinuria .....p. 570
A Handy Instrument for Use in Partial Torsion of the Uterus..... p. 579

[24] Palmer, L. S., T. W. Gullickson, W. L. Boyd, C. P. Fitch, and J. W. Nelson, 1941. The effect of rations deficient in phosphorus and protein on ovulation, estrus, and reproduction in dairy cows. *Jnl. Dairy Sci.* 24:3, pp. 199-210.



Sheep

Enterotoxemia from Overeating in Feedlot Lambs[25]

In investigational work by the author while at the Colorado Experiment Station, overeating was found to be the cause of the most serious losses of lambs on feed. The consumption of too much concentrated feed, such as corn, cane, barley, and peas, seems to be the primary cause. The overeating results in an enterotoxemia, a thermolabile toxin being absorbed from the small intestine.

Affected animals are invariably the largest, fattest, most vigorous and greediest lambs in the lots. A few may throw back their heads, stagger for a little while, then fall and die in convulsions. Others may live for a few hours, standing with heads drawn back or lowered, moving in a circle, pushing against the fence, or falling to the ground and lying there swinging their legs back and forth.

A history of fat lambs dying on full feed is indicative of overeating if necropsy fails to reveal pneumonia and bacteriological findings are negative. The finding of sugar in the urine of acute cases is regarded as diagnostic. Scouring among some of the larger lambs should be a warning sign, or if some go off feed, this should indicate a reduction in the amount of grain fed.

Death losses can be stopped overnight by withholding grain. The most satisfactory method of control is to decrease the grain to a point where no further trouble occurs and then increase it gradually.

[25] Thorp, Frank, Jr., 1941. Overeating (enterotoxemia) in feedlot lambs. *Mich. Sta. Quar. Bul.* 23:3, pp. 186-187.

Causes of Outbreaks of Abortion in Ewes[26]

Abortion may occur in a high percentage of ewes in a flock. Owners frequently suspect certain feeds or lack of them as a cause, but it appears unlikely that feeds of any type cause much abortion. Extreme malnutrition and severe emaciation may result in loss; such cases are easily detected by the history and the general condition of the animals.

Old ewes often abort from no apparent cause other than old age, and considerable abortion may be encountered in a flock where a high percentage of the ewes are quite old. Examination of the mouths of aborting ewes is therefore helpful in arriving at a diagnosis; if young ewes are affected, another cause must be sought.

Investigation of outbreaks in five Wyoming flocks (two range, two farm, and one semi-range) resulted in the incrimination of a Vibrio organism in a majority of cases.

The organism can be isolated by culturing abomasal contents from aborted lambs on cystine - veal - infusion - dextrose - agar slants, sealed and incubated for three to seven days. The Vibrio organism is Gram negative, highly motile, non-spore-forming and without capsules. In young cultures it stains readily. Smears made direct from the tissues do not give satisfactory results.

The agglutination test for vibrionic abortion does not offer a practical means of diagnosis at present.

The trouble is usually encountered late in the season when most of the ewes are due to lamb soon. The disease is transmitted from aborting to noninfected animals in from 10 to 21 days. It appears probable that the first ewes become infected from stagnant, fecal-contaminated water, in which the infection may have been carried over the preceding season. Their feces then serve as a fresh source of contamination. Control measures therefore involve unquestionable water and feed and taking all other possible measures to prevent the transmission of the disease from aborting to noninfected animals.

[26] Lee, A. M., and L. H. Scrivner, 1941. Experimental work upon recent outbreaks of abortion in ewes. *Am. Jnl. Vet. Res.* 2:2, pp. 50-54.

No Carryover of Vibrio Infection[27]

Extensive *Vibrio fetus* infection in a Michigan flock of 79 sheep was not carried over to the following lambing season, although the animals were kept on the same ground and received feed and water from the same sources as before.

Production of Heat and Ovulation in Anestrous Ewes[28]

In most sections of the United States the ewes of most breeds of sheep will breed only during the fall and winter months. Because of this, the majority of lambs are born in the spring and marketed in the fall. Lambs going to market during the spring and early summer generally bring a higher price, but for their production the ewes must be bred during the spring months. A sure but economical means of causing ewes to breed at this season would be of decided value to the sheep industry.

Experimental attempts were made to produce heat and ovulation in the anestrous ewe by injections of endocrine substances. Injections of pregnant-mare serum, sheep anterior pituitary extract, and Progynon-B, singly or in combination, were given to 30 ewes. Occurrence of heat was checked by the use of "teaser" rams and the ovarian stimulation was noted at the time of spaying.

Injections of pregnant-mare serum or anterior pituitary extract or both produced ovulation without heat. Injections of Progynon-B produced heat, usually without ovulation. Combinations of pregnant-mare serum and Progynon-B generally produced neither.

Attempts to devise a method of using vaginal smear records to detect ovulation whether or not estrus was induced, were unsuccessful.

Since both the pregnant-mare serum and the anterior pituitary extract produced ovulation quite regularly, it would be theo-

[27] Ryff, J. F., 1941. Failure of natural *Vibrio fetus* infection to carry over in ewes. *Am. Jnl. Vet. Res.* 2:4, pp. 367-368.

[28] Bell, T. Donald, L. E. Casida, G. Bohstedt, and A. E. Darlow, 1941. Production of heat and ovulation in the anestrous ewe. *Jnl. Agr. Res.* 62:10, pp. 619-625.

retically possible to carry out a breeding program with the aid of these substances. However, this is impractical because the absence of heat would make it necessary to resort to force-mating or artificial insemination. A different method, producing both heat and ovulation, will need to be developed before the breeding of ewes out of season becomes practical.

Diagnosis and Treatment of Listerellosis in Sheep[29]

It seems likely that listerellosis in sheep in the United States has frequently been confused with hemorrhagic septicemia and "forage poisoning." Rabies, feedlot toxemia and the toxemia of pregnancy are other conditions that must be considered in making a differential diagnosis.

An outbreak in a flock of 300 sheep on an Illinois farm began in March, 1941, and lasted until late in July. The sheep were housed in rather small, but clean and dry, quarters at the beginning of the trouble. They were turned out to pasture shortly afterward.

Affected animals appeared sluggish, stood apart from the other sheep, and occasionally moved in a small circle, usually to the right. The head was held in an abnormal position by some. There was an occasional rapid twitching of the skin over the sides. Trembling was noted in several ewes when they stood still. Vision was not markedly impaired unless the sheep lived for a few days after being taken sick. In such cases, during the later stages of the disease, there was a slight opacity of the cornea, then a marked keratitis, followed by a mucopurulent discharge. A few sheep showed a mucous discharge from one or both nostrils. A symptom that was fairly constant and usually observed before most of the other symptoms was "ear drop"; one ear, usually the right, drooped noticeably. In the later stages of the disease a pharyngeal paralysis made the oral administration of medicaments practically impossible.

Temperatures were higher (104° F. to 105° F.) very early in the course of the disease, dropping as the animals became visibly sick. The highest temperature found in visibly sick sheep was 103.2° F.

As a rule lambs died shortly after showing symptoms. Ewes usually remained alive 24 to 48 hours, death being preceded by a short period of prostration and coma. When down on one side (usually the left) a fairly constant symptom was violent "paddling" motions.

Three goats kept to serve as nurse goats for orphan lambs remained healthy until late in the outbreak, although two of the lambs with them died. They eventually sickened and died.

Necropsies performed on two lambs disclosed enlarged and degenerated kidneys. The heart showed a few petechial hemorrhages near the coronary arteries. Ewes that died showed no particular pathological alterations. Diagnosis was based on clinical symptoms, microscopic changes found in the brain, and bacteriological findings.

Vaccination of unaffected (but already exposed) sheep with Listerella bacterin appeared to be of no value in checking the disease. Medicinal treatment was of no avail, except in two ewes in which treatment was started at a very early stage, before marked clinical symptoms appeared. They were given two doses of neoprontosil solution intravenously, 48 hours apart, and sulfanilamide in tablet form, 240gr daily for three days and then 150gr daily for two days. The temperatures were 105°F. and 104.1°F. at the time of the first treatment, dropping to 103°F. and 103.5°F., respectively, on the fourth day. Both ewes were left out night and day during treatment. Their appetites were poor and they lost considerable flesh. They drank water freely. Both eventually recovered.

It is believed that if maximum benefit is to be derived from the administration of sulfanilamide, large doses (360gr per day) should be given at the outset. If smaller doses are given, with the thought of continuing these over several days, pharyngeal paralysis may set in and render the oral administration of drugs rather difficult.

[29] Jensen, G. W., and W. J. Gay, 1941. Ovine listerellosis. *No. Am. Vet.* 22:10, pp. 601-605.

Phenothiazine for Sheep[30]

Experimental data indicate that repeated treatments with phenothiazine are more effective than single treatments for the removal of intestinal parasites of sheep, and that the gains in weight of the animals receiving repeated doses exceed those treated only once. A dose of 25gm, repeated at two-week intervals, can be tolerated and is effective.

Abscesses Affecting the Central Nervous System of Sheep[31]

Abscesses affecting the brain or the cord, or both, of horses, cattle and swine are frequently mentioned in veterinary literature, but there are few reports of this condition in sheep.

In lambs, as in calves and colts, it generally has been considered that such abscesses are the result of navel infection. The origin of abscesses of the brain and cord in older sheep is more obscure.

The outstanding symptom when the cord alone is affected is posterior paralysis, either sudden or gradual. Otherwise the animal usually appears normal at first. Considerable loss of flesh ensues unless the animal has easy access to food and water.

When the brain is affected, either alone or with the cord, complete paralysis and stupor have been observed, followed by loss of consciousness and death. The respiration rate is increased. Lateral bending of the neck is sometimes present.

Abscesses along the spinal column seemed to affect primarily the vertebral bodies or the joints or both with a resultant softening of the affected bones. Pressure of these abscesses on the cord for any great length of time causes the cord to become smaller and softer. In advanced cases there is marked degeneration of the nerve fibers and cells, many of which disappear.

The brain abscesses observed have been either in the lateral ventricles or cerebellum. The brain tissue around the abscesses seemed to be softer than normal.

The content of the abscesses was usually a thick, greenish-yellow pus, cultures of which either revealed *Corynebacterium pyogenes* or were negative.

Ovine Balano-Posthitis[32]

So-called venereal infection of sheep has been recognized in the United States and elsewhere for over 30 years. It has been known as foul sheath, sheath infection, balanitis, and the venereal form of lip and leg ulceration. Balano-posthitis is probably the best term for the disease.

Lesions are most commonly found at the prepucial orifice and on the lips of the vulva, and in the male the penis may be involved. The disease is characterized by ulceration with scab production. The more severe lesions have been noted on the prepuce and vulva. Severe sheath lesions usually result in phimosis or paraphimosis. The penis lesion is ordinarily a mild inflammation with ulceration, unless accompanied by paraphimosis, which then results in a severe process with the more extensive ulceration and heavy scab formation such as is found on the prepuce.

The disease has formerly been classified as a necrophorus infection. However, experiments carried out by the authors demonstrate that the infective agent is actually a filterable virus.

See also in VETERINARY MEDICINE:

March
Sheep Nutrition ..... p. 164
May
A New Treatment for Internal Parasites of Sheep ..... p. 272
Pregnancy Disease in a Ewe..... p. 272
June
Nutritional Keratitis in Lambs..... p. 322
September
Contributing Factors Causing Death in Nodular-Worm-Infested Sheep ..... p. 449
October
Comparison of Phenothiazine and Copper Sulphate-Nicotine Sulphate Mixture as Anthelmintics for Sheep..... p. 502
November
Suggestive Evidence of Trace Element Deficiency in Illinois Sheep..... p. 572

[30] Hay, James R., 1941. The treatment of sheep parasites with repeated doses of phenothiazine. *J.A.V.M.A.* 98:771, pp. 462-465.

[31] Hull, F. E., and E. L. Taylor, 1941. Abscesses affecting the central nervous system of sheep. *Am. Jnl. Vet. Res.* 2:4, pp. 356-357.

[32] Tunnicliff, E. A., and P. H. Matischeck, 1941. A filterable virus demonstrated to be the infective agent in ovine balano-posthitis. *Science* 94:2438, pp. 283-284.

Swine

Disinfection of Premises Following Swine Erysipelas[33]

Practicing veterinarians frequently are asked to suggest methods of eradicating swine erysipelas infection from premises following an epizootic. They are also interested in knowing which disinfectant provides the greatest margin of safety when used on the hands following exposure to this organism.

Tests of various disinfecting agents showed that *Erysipelothrix rhusiopathiae* is readily destroyed by household lye (sodium hydroxide), and that its high efficiency and low cost make it the disinfectant of choice. Further, it is odorless and the recommended dilution of 1:150 is not toxic to animals when consumed in moderate amounts, nor is it markedly caustic to the skin.

The hypochlorites also destroy the organism readily. Phenol, liquor cresolis and related products, Lugol's solution, tincture of iodine, triethanolammoniumlauryl sulphate and household soap are moderately effective. The prophylactic value of thoroughly washing the hands with soap and warm water after contact with *E. rhusiopathiae* is emphasized.

The organism is resistant to formaldehyde, hydrogen peroxide, alcohol, and salt brines.

[33] McCulloch, Ernest C., and Stewart A. Fuller. 1941. The relative efficiencies of disinfectants in killing *Erysipelothrix rhusiopathiae*. *Am. Jnl. Vet. Res.* 2:2, pp. 77-83.

The Cultural and Biochemic Properties of E. Rhusiopathiae[34]

Swine erysipelas is becoming of increasing importance in the United States. Since little work has been done on the bacteriology of the disease, this study was undertaken to learn more about the cultural and biochemical characteristics of the etiologic agent, *Erysipelothrix rhusiopathiae*.

E. rhusiopathiae is a short, slender, straight or curved rod 1 to 2μ in length. On prolonged culture it forms long, filamentous threads from 4 to 15μ long. The long, curved threads are often beaded. Both the short and the filamentous forms are Gram positive, but they decolorize readily on prolonged incubation.

Two types of colony formation are found. The short rods form small, round, shiny, discrete colonies with entire edges. The long, thread-like forms are found in colonies that are irregular in outline, have an uneven surface and are opaque in contrast to the translucent colonies of the short forms.

E. rhusiopathiae is not active in producing changes on commonly used media. In gelatin-stab cultures the growth radiates from the line of inoculation to give the appearance of a test-tube brush. A narrow zone of alpha hemolysis develops around deep colonies in blood agar. In litmus milk

[34] Karlson, A. G., and I. A. Merchant. 1941. The cultural and biochemic properties of *Erysipelothrix rhusiopathiae*. *Am. Jnl. Vet. Res.* 2:2, pp. 5-9.

a slight acid reaction may be formed, but usually no change is observed. Potato does not support growth.

Indol is not formed and nitrates are not reduced. The Voges-Proskauer reaction, methyl red test, methylene blue reductase test and catalase test are all negative. Aesculin is not hydrolyzed. Lead-acetate medium is blackened by the formation of hydrogen sulphide.

The reaction on fermentable media is weak. No gas is formed. Acid is produced readily only from dextrose, lactose, galactose and levulose. A delayed reaction is seen on mannose and cellibiose. No acid formation is observed on arabinose, xylose, rhamnose, maltose, melibiose, sucrose, trehalose, raffinose, melezitiose, dextrin, starch, inulin, amygdalin, salicin, glycerol, erythritol, mannitol, sorbitol, dulcitol, or inositol.

The microorganism will grow under reduced oxygen tension as well as anaerobically. An alkaline reaction, pH 7.2 to pH 7.6, is desirable, for maximum growth. Mice and pigeons are susceptible to artificial inoculation. Guinea pigs are resistant. Virulence is increased by passage through susceptible animals.

Endocarditis Not Diagnostic of Swine Erysipelas[35]

The occurrence of a vegetative or verrucose endocarditis is recognized as one of the lesions of the chronic form of swine erysipelas. It should not, however, be regarded as conclusive evidence of the presence of this disease, since certain streptococci produce proliferative endocardial lesions indistinguishable from those caused by *Erysipelothrix rhusiopathiae*.

Of 19 cases showing this lesion, all similar in gross appearance and on microscopic examination, *E. rhusiopathiae* was isolated from 11 and streptococci from eight.

Bacteriological procedures which result in the isolation of the organisms involved are the only dependable means of making a definite diagnosis. Where these are impractical, the history and the present condition of the drove will prove helpful from a standpoint of diagnosis, since the endocarditis of streptococcic origin is unlikely to appear in more than one animal, while swine erysipelas is rarely confined to a single hog in a drove.

[35] Kernkamp, H. C. H., 1941. Endocarditis in swine due to *Erysipelothrix rhusiopathiae* and to streptococci. *J.A.V.M.A.* 98:767, pp. 132-133.

Efficacy of Crystal-Violet Vaccine Against Hog Cholera[36]

The need for an immunizing agent to produce immunity against hog cholera without the danger connected with the use of live virus has long been recognized. Crystal-violet vaccine was developed as a possible solution of this problem. It is a modified virus made from the defibrinated blood of pigs affected with cholera. The name is obtained from the fact that crystal violet, an aniline dye derived from coal tar, is the principal attenuating agent used in its preparation.

Potency tests have demonstrated that the method used in the preparation of the vaccine attenuates the virus to a point where it does not produce hog cholera in from 1cc to 10cc doses, and that vaccinated pigs possess a high degree of immunity three weeks after the vaccine is administered.

Farm tests in Iowa have shown good results from the use of the vaccine, administered subcutaneously on the inner side of the thigh in 5cc doses for pigs weighing less than 75 pounds and 10cc doses for pigs weighing more. It has been found that better results are obtained when pigs are treated after they are eight or ten weeks of age. Immunity tests on herds treated in this manner resulted as follows: 214 hogs from 55 herds were exposed; 190 (89%) were adequately protected; 10% showed severe reactions; only 1% died.

While the duration of immunity following treatment with crystal-violet vaccine has not been definitely established, the vaccine seems to protect swine quite well through the fattening period, provided they have been treated after they were eight or ten weeks of age.

There is a distinct interference in the antigenic action of the vaccine when anti-

[36] Cole, C. G., and C. N. McBryde, 1941. Experiments with crystal-violet vaccine for the prevention of hog cholera. *J.A.V.M.A.* 98:771, pp. 454-457.

hog cholera serum is given at the same time or shortly thereafter. A similar interference occurs when the vaccine is administered to pigs suckling immune sows.

Experiments have shown that crystal-violet vaccine retains its potency when held in cold storage from one to four years. It also withstands remarkably well temperatures equivalent to and in excess of a high summer temperature, and for this reason appears to be capable of standing considerable abuse in this respect, but it is considered advisable that it be held under cold-storage conditions like other biological products.

Further field trials of this product are being carried out.

Sulfaguanidine for Enteritis in Swine[37]

Sulfaguanidine has been suggested for use as a possible therapeutic agent in enteric infections of swine. Experiments were undertaken to determine the blood concentrations of the drug following various dosages and the toxic effects of such dosages, with a view to arriving at a therapeutic dose for trial in swine enteritis.

It was found that the sulfaguanidine may be safely used in swine in doses of one gram per 20 pounds of body weight twice daily for five days. Blood concentrations reached a peak of 2.2mg% free and 3.6mg% total sulfaguanidine on the fifth day and thereafter declined, although traces were still detectable on the eighth day. (Following a single dose at this level, the blood concentration reached a peak of about 1.0mg% free, 1.5mg% total sulfaguanidine, from six to eight hours after administration.) Fecal concentrations reached an average peak of about 590mg% on the sixth day.

The dosage tolerated by swine was fatal for lambs, and doses of 10gm per pound of body weight proved toxic for swine, when repeated twice daily for five days. Massive single doses produced no toxicity.

Although the absorption rate of sulfaguanidine from the intestinal tract is much lower than that of sulfanilamide, a relatively greater quantity is conjugated to form the less soluble acetylsulfaguanidine. Because of the effect of the latter on the kidneys, absorbed sulfaguanidine is more toxic than absorbed sulfanilamide. The only pathological lesions apparent from lethal doses were those in the kidney, inability to eliminate the absorbed drug through the urine at a sufficient rate resulting in a tubular nephritis.

Preliminary experiments with a view to evaluating the effect of the drug in clinical cases of enteritis in swine gave results sufficiently encouraging to warrant further investigation.

The Nutritional Requirements of Swine[38]

Symptoms produced by a deficiency of different mineral elements, vitamins, and amino acids are so nearly identical or overlapping that a differential diagnosis must be made by elimination. A knowledge of what constitutes an adequate ration is a prerequisite. The ability to appraise the ration fed and the symptoms observed and to fit together the possible deficiencies in the ration with the observed results in symptoms gives the clinician the best approach to the prevention and correction of deficiency diseases.

Several of the 10 essential amino acids are absent from vegetable and cereal feeds, and can be supplied only through feeds of animal origin. The outstanding symptom of amino-acid deficiency is lack of appetite for the feed provided; other symptoms include harsh, dry coat, general sluggishness of movement, ascites and edema.

Of the essential mineral elements, zinc, manganese, potassium, sodium, chlorine, and cobalt are unlikely to be lacking in rations commonly fed. However, an occasional live stock owner refuses to feed salt to his hogs, so that in any case of malnutrition the salt supply should be investigated.

Lack of copper and iron produce anemia. The addition of two ounces of ferric oxide

[37] Cameron, H. S., and W. A. McOmie, 1941. Blood-concentration studies on sulfanilylguanidine in swine and sheep. *Cor. Vet.* 31:4, pp. 321-330.

[38] Hawthorne, George A., 1941. Nutritional diseases of swine. *No. Am. Vet.* 22:3, pp. 147-155.

and 1½ ounces of copper sulphate per ton of total ration will obviate the possibility of a deficiency of these elements.

Many ills besides goiter and big neck in pigs may be chargeable to iodine deficiency. The birth of dead pigs or weak and hairless pigs is an indication of lack of this element. The iodine-deficient territories are mostly around the Great Lakes region and in the northwestern states, although there is a marginal region, probably including all or part of Iowa, where the deficiency is not extreme enough to produce frequent goiter, but does lead to less spectacular troubles. Where iodine is added to rations containing a suboptimal iodine supply, pigs show an increase in skeletal growth and general growth rate, lower mortality, and greater disease resistance. There is a greater need for it during infancy, pregnancy, and lactation. It can be given in the form of 0.4 ounce of stabilized potassium iodide per ton of feed.

Magnesium is seldom lacking in swine rations. Where it is present in excess, its calcium-wasting effect may cause a marked decalcification of the bones.

Calcium and phosphorus are the two mineral elements needed in the largest amounts. Their assimilation is closely correlated to the presence of adequate amounts of vitamin D. Pathological manifestations may result from a deficiency of any one of the three, or from a calcium:phosphorus imbalance. Tankage contains an excellent supply of both calcium and phosphorus in about the ratio of 2:1. If tankage is omitted from the ration, the addition of 0.5 to 1% of a high quality feeding lime is indicated. Phosphorus is not so likely to be deficient.

An adequate supply of vitamin D will take care of an unfavorable calcium:phosphorus ratio unless it is too extreme. In the winter, irradiated yeast is the cheapest available source of supplemental vitamin D for farm animals.

Vitamin A deficiency in swine is manifested by irregularities in breeding and the birth of dead or weak, blind pigs; scour in pigs may also be related to this deficiency. Farm swine rations are frequently dangerously low in vitamin A. Good quality alfalfa hay and yellow corn are cheap and readily available sources of this vitamin.

Of the B-complex, thiamin and pantothenic acid are unlikely to be deficient in swine rations. The richest natural sources of riboflavin for hogs are green feeds, alfalfa meal, dried skimmilk and buttermilk, dried whey, and animal meat products. Pig pellagra and some forms of enteritis are associated with nicotinic acid deficiency. Animal tissues and yeast are relatively rich sources of this vitamin. Where disease is present, the administration of pure nicotinic acid may be beneficial.

A deficiency of vitamin E is very improbable on any natural diet that contains adequate vitamin A.

Pig Anemia and Immunity[89]

An experiment was carried out to determine whether or not the development of pig anemia destroys the passive immunity against hog cholera obtained by the pigs from the sow. The results indicated that pig anemia does not destroy this immunity.

Since anemia is a debilitating condition, the authors suggest that additional work should be done to prove the validity of the often-repeated statement that if a pig's resistance is lowered by exposure to the elements, parasitism, malnutrition, etc., it becomes more susceptible to hog cholera.

See also in VETERINARY MEDICINE:

February
Swine Dysentery ..... p. 100
April
Swine Practice ..... p. 206
Salt Treatment for Bloody Diarrhea ... p. 223
May
Vesicular Exanthema in California .... p. 240
A Few Timely Tips on Swine Practice .. p. 270
September
Mixed Infections in Swine ..... p. 447
October
Salt for Enteritis in Swine ..... p. 495
Chemical Changes in Swine Blood ..... p. 510
Vitamin E and Brucella Infection ..... p. 533
November
Small Amounts of Minerals for Pigs .... p. 544
A Locomotor Disorder in Pigs ..... p. 545
Urticarial Form of Swine Erysipelas ... p. 571

[89] Vardiman, P. H., F. M. Bolin, and A. S. Severson, 1941. Pig anemia and hog-cholera immunity. *Am. Jnl. Vet. Res.* 2:4, pp. 354-55.

Small Animals

The Nutritional Requirements of Dogs[40]

Dogs are facultative omnivora. They can subsist on various diets composed of foodstuffs of either animal or plant origin. It has been shown that they can be maintained in good health on an exclusive meat diet or on a completely meatless diet, provided that the components of the ration are so selected as to furnish all the necessary nutritive elements. Considerations of convenience and economy suggest the advisability of a mixed diet.

Protein, supplying the essential amino acids, is one of the most important materials in foodstuffs. It is generally agreed that the ratio of protein to carbohydrates and fats combined should be between 1:2 and 1:4. Meat is an excellent source of protein. It is digested best when given in the form of lumps. Milk and milk products are a highly satisfactory source of protein. Sour milk is digested better than sweet milk, and fresh milk better than condensed. Eggs, though they have a high protein content, are not very well assimilated by dogs when they alone are fed. A mixture of milk and raw egg, however, is digested better than milk alone. Fish is in general inferior to meat or milk as a protein supplement. Proteins from vegetable and cereal sources are commonly deficient in certain essential amino acids.

Since carbohydrates and fats are a cheaper source of energy than proteins, and since carbohydrates have a protein-sparing action, they should be incorporated in dog diets. The ability of the dog to digest cooked starch is no longer questioned. Cereals are digested well. Most fruits and vegetables are not highly digestible, although they are improved by cooking.

The fat requirements of an animal vary with age and activity. A range of 2 to 4% of fat in the diet is perhaps best suited for all types of dogs. Too much fat may give rise to vomiting and diarrhea.

A mixed diet providing the proper proteins, carbohydrates and fats is not likely to be deficient in any of the vitamins required by dogs.

The energy requirements of dogs vary with age, weight, and activity. The accepted standard is 70 to 80 calories per kilogram of body weight per day. Growing puppies and pregnant or lactating bitches require more.

From a standpoint of health and economy, a mixture of foodstuffs containing at least 10% of protein, most of which is of animal origin, and 2 to 5% of fats, incorporated in a suitable cereal and vegetable mixture, is recommended. A good general recommendation to dog owners is to feed some meat and any cereals and vegetables that are available, provided the dog will eat and tolerate them; the latter can be determined only by trial.

---

[40] Schlotthauer, Carl F., 1941. The diet of the dog. *Can. Jnl. Comp. Med.* 5:2, pp. 36-42.

Use of Vaccine in Chronic Staphylococcus Infections[41]

Vaccine combined with local medication gives fruitful results in the treatment of chronic staphylococcic infections.

In leucorrhea associated with vulvitis, vaginitis, or cervicitis, or all three, 0.5cc of staphylococcus vaccine or toxoid is given the first day and subsequent injections every four or five days, increasing the dose 0.5cc each time, until five or six doses have been administered. In vulvitis or vaginitis the parts are irrigated with Dakin's solution; where cervicitis is present the cervix is cauterized with 10% silver nitrate. The local treatment is usually not repeated.

Onychia is usually due to a staphylococcic infection following trauma. Vaccine is administered at the same rate as above, and local treatment consists of the application of antiphlogistine, soaking in hot magnesium sulphate, lancing if an abscess forms, etc.

Local medication has proved of little value in the treatment of pedal furunculosis. Injections of staphylococcus toxoid are given, beginning with 0.5cc and repeating every three to four days, increasing 0.5cc each time, up to as many as 10 injections if necessary. (Diseases commonly accompanied by swelling of the feet, such as nephritis and filariasis, should be eliminated from the diagnosis, since such cases would obviously not respond to vaccine alone.)

Where catarrhal otorrhea is caused by a staphylococcus infection, the response to treatment is quicker if local medication is accompanied by vaccine.

Recurring skin ulcers and pustular eczema are usually difficult to clear up. Staphylococcus toxoid plus some soothing application to the body can be given to advantage in these cases. Novoxil can be applied to the ulcers, with or without bandaging, depending upon the location, and medicated oil such as sulphur, olive oil and oil of cade, to the rest of the body.

[41] Barto, L. R., 1941. The clinical use of staphylococcus vaccine. *J.A.V.M.A.* 98:767, pp. 152-153.

Treatment of Pyometra by Marsupialization[42]

When pyometra is diagnosed early and the patient is in good physical condition, it may respond to proper medication; or hysterectomy may be performed safely. However, the majority of cases seen in daily practice have advanced to a point where medication is useless, and where the animal's physical condition is such that hysterectomy is very risky. In such patients the author has had good results from the marsupialization operation; even a number of septicemic bitches have responded to the drainage operation, plus later supportive treatment with neoprontosil, normal serum, and other parenteral fluids.

The operation is done in two stages. The bitch is prepared by giving 100cc of normal serum, or from 200 to 500cc of a 5% solution of glucose in normal saline solution, intravenously. About one hour before operating a suitable dose of morphine sulphate is given. The hair is clipped from an area about eight inches square in either the right or left abdominal region. It is then shaved, scrubbed with soap and water, washed with alcohol, and painted with tincture of iodine or merthiolate. The bitch is draped in the usual fashion and the incision line in the skin is infiltrated with a 2% solution of procaine with adrenalin chloride (1-1000). The skin is incised for about two inches dorsoventrally and the scalpel discarded. The muscle layers are injected with the local anesthetic, cut to the peritoneum, and held back with Allis forceps. The peritoneum is picked up with

[42] Finkelstein, B. J., 1941. Marsupialization of the uterus in pyometra. *Cor. Vet.* 31:4, pp. 351-354.

In the treamtent of pets, the emotional as well as the economic factor must be considered. The successful small animal practitioner is always on the alert for improvements in his diagnostic and therapeutic technics.

thumb forceps, snipped with scissors, and the opening enlarged to the size of the muscle incision. An assistant places a small pillow under the animal opposite the incision to raise the abdominal contents toward the wound. A portion of the pendant horn of the uterus on the exposed side appears in the opening. Using a curved atraumatic needle threaded with No. 1, 10-day chromic catgut, a series of interrupted sutures is placed around the opening through the muscular wall and peritoneum and the serous and muscular coats of the uterus. Seven or eight sutures usually suffice. Two or three silk or linen sutures are placed in the skin at the edges of the wound to make the exposed opening smaller. The wound is then covered with a wet, sterile dressing, and the dog released from the table.

In 24 hours a firm union has formed between the peritoneal surfaces sutured together and the second stage of the operation is performed. With the animal in standing position, if tractable, a hole is punctured in the uterus with the cautery and a short piece of ⅜-inch sterile rubber tubing is inserted. This is fixed to the abdominal wall with two safety-pins, the whole being kept in place with two strips of adhesive tape around the body. The contents of both horns of the uterus drain out in a short time. The tube is removed in two or three days, after a fistula has been established to permit further drainage. The opening in the uterine wall is not permitted to close until drainage is complete. The patient can eat and retain fluids the day after the drainage, and can be discharged on the fourth or fifth day if the owner wishes. The wound heals spontaneously in about three weeks.

If desired, hysterectomy can be performed safely in a month or two.

If the wall of the uterus is very thin and difficult to suture to the abdominal wall without penetration, it is possible to complete the operation in one stage without waiting for the adhesion to take place.

This operation has been performed by the author in 30 cases of pyometra, with 20 recoveries, five deaths, and five cases of permanent fistula resulting from the operation.

Blood Transfusions in Dogs[43]

The therapeutic value of blood transfusion rests on the following physiological effects: (1) immediate increase in fluid bulk or volume of circulating blood; (2) immediate increase in oxygen-carrying capacity of blood; (3) increase in coagulability of blood; (4) possible stimulation of hematopoiesis; (5) possible immunologic factors. Blood transfusion is therefore indicated in the following conditions: (1) hemorrhage of either operative or traumatic origin; (2) anemia; (3) shock—surgical or traumatic; (4) pre-and post-operative therapy; (5) toxemias—uremia, extensive burns, gas poisoning.

Conditions in which blood transfusions are contraindicated are those involving the lungs, such as pneumonia and pulmonary edema; the blood, which is unable to pass through the lung capillaries fast enough, causes an abnormal strain upon the heart which often results in its failure. Transfusion is also contraindicated in severe nephritic conditions associated with anuria and oliguria.

Any dog may be used as a donor for any other dog; typing is unnecessary except perhaps in the transfer of blood from a purebred to a purebred. If a dog is subjected to repeated transfusions from the same donor, however, a sensitization may develop; it is therefore advisable to use a different donor each time.

Select a strong, healthy, mature dog, preferably three years of age or older. It should be dieted for 18 to 24 hours before use in order to reduce the chances of allergic food reactions. Anesthetize the animal with nembutal (which does not affect the blood) and lay it on its right side. Clip, shave, wash, and paint with tincture of metaphen or mercresin the area on the left side of the lower thoracic region, bounded by the third to sixth ribs, and from the intercostal junction upward about four inches. Cover the body with a shroud which has an elliptical opening about three inches long. Insert a 12- or 13-gauge Lewisohn

[43] Robertson, Harry J., 1941. Blood transfusions in dogs. *J.A.V.M.A.* 98:771, pp. 482-494.

needle, 1½ to two inches in length, between the ribs where the pulsation of the apex beat of the heart can be seen or felt. With a firm, quick thrust piece the heart wall, the needle entering one of the ventricles.

For direct transfusion, the Scannell transfusion apparatus is used. This consists of a 20cc syringe and a three-way mechanical valve from which run three tubes; one for carrying blood from the donor into the syringe, one leading to the recipient, and the other running to a beaker of saline solution, by means of which the syringe can be flushed.

The beaker, containing 100 to 200cc of sterile normal saline solution, is heated to body temperature. Tubing, needles and syringes should be boiled or dry-sterilized in an autoclave. The needle for the recipient (18- or 15-gauge, 1½ inches long) is inserted into the saphenous or radial vein, or if they cannot be raised, into the jugular. The middle tube is immersed in the saline solution and the latter drawn into the syringe. The valve is turned to the tube leading to the recipient, forcing the solution through the tube and clearing it of air. The end of the tube is then attached to the needle in the vein of the recipient and a few cc of solution forced through the needle to prevent clotting. The needle is then inserted into the heart of the donor, as described above. The valve is turned to the tube leading to the donor, forcing saline solution through and freeing it of air, and the tube is attached to the needle. The blood is withdrawn to the capacity of the syringe as rapidly as possible and then, by control of the valve, injected into the recipient. This process is repeated until the required amount is administered. After every fourth syringe full of blood, the syringe should be flushed with saline solution to prevent or remove clots.

For indirect transfusion, blood is drawn into a flask containing 10cc of 3% sodium citrate to each 100 of blood, using proper aseptic precautions. This may either be used immediately or refrigerated at 39°F. Refrigerated blood is inspected daily for any signs of bacterial contamination, excessive hemolysis or clotting, and discarded if such signs appear. It should not be used when more than 10 days old in any case. Since sedimentation occurs during refrigeration, the flask must be gently agitated to mix the cells again when the blood is to be used for transfusion. This flask and another containing 50cc of physiological saline solution are immersed in hot water until body temperature is reached. The solution is poured into the Kelly infusion jar to clear the tubing of air. The adapter is then connected with the needle which has been inserted into the vein of the recipient and the saline solution allowed to flow. The required amount of blood is decanted through a sterile filter of four layers of gauze placed in the mouth of the Kelly infusion jar. The speed at which the transfusion may be given is variable; about 15cc per minute seems to be most satisfactory.

Both methods of transfusion give satisfactory results. The indirect method is perhaps simpler and more convenient. No matter what method is used, it is essential that the transfusion be stopped immediately if any alarming symptoms occur.

Treatment of Heartworm[44]

Although fuadin is the drug of choice in treating canine heartworm, present methods of treatment with this agent are not ideal. Trials of combined sulfanilamide-fuadin therapy indicate that a 10-day course of the two drugs is effective against *Dirofilaria immitis;* the data suggest that the combination results in a greater percentage of cures than are produced by fuadin alone.

The following dosage is suggested for the combined 10-day treatment. Sulfanilamide (administered *per os* in two doses, morning and evening): for dogs weighing 10 to 15kg, 45gr daily; 15 to 20kg, 60gr daily; 20 to 25kg, 90gr daily. Fuadin (administered intramuscularly as a single dose in the morning): for dogs weighing 10 to 20 kg, 1cc for four days, 1.5cc for six days; 20 to 25kg, 1.5cc for four days, 2cc for six days.

[44] Brown, H. W., and A. J. Sheldon, 1941. Treatment of the canine heartworm (*Dirofilaria immitis*) with fuadin and sulfanilamide. *J.A.V.M.A.* 98:771, pp. 477-481.

Encephalitis in Dogs[45]

The problem of central nervous system disturbance in dogs is a large one, but definite progress is being made in separating one disease from another. Definite evidence has accumulated that canine encephalitis can be caused by (1) three distinct viruses—canine distemper, fox encephalitis, and a third virus as yet unnamed; (2) infection with a protozoon called "Toxoplasma," about which little is known so far as dogs are concerned; and (3) a vitamin deficiency—probably vitamin B_1, though more than one vitamin may be involved.

Differential diagnosis is difficult at present. Canine distemper and fox encephalitis occurring in dogs may be differentiated by laboratory methods. The inclusion bodies observed in sections of the brain are dissimilar in the two diseases. Thus far no inclusion bodies have been found in association with the third type of virus encephalitis.

Potency Test for Rabies Vaccine[46]

A quantitative potency test for rabies vaccine has been developed at the Rockefeller Institute. The virulence of a given product is tested by injecting mice intracerebrally and its immunizing potency by vaccinating mice with the material and testing them three weeks later with graded doses of virulent virus. This mouse test is regarded as a reliable method of evaluating rabies vaccine.

Applied to commercial vaccines, the test showed that those containing virulent virus possessed considerable immunizing value, while non-virulent phenolozed vaccines did not. Non-virulent chloroformized vaccines gave doubtful results in the recommended dose, but were effective, although irritant, in twice the recommended dose. These results were checked on dogs, with similar results.

Because of the dangers of mass vaccination with virulent vaccine, efforts to produce a completely effective non-virulent vaccine should be continued.

[45] Green, Robert G., 1941. The problem of encephalitis in dogs. *J.A.V.M.A.* 99:772, pp. 45-48.
[46] Webster, Leslie T., 1941. *Am. Jnl. Pub. Hlth.* 31:1, pp. 57-59.

The Principle of Tissue Autolysis in Canine Therapy[47]

Self-perpetuating tissue autolysis involving the blood cells can be induced experimentally in chickens and in dogs by the intravenous injection of freshly emulsified, desiccated or autolyzed homologous (species) tissues, if these are made frequently and the dosage progressively increased, but if they are given less often self-perpetuating tissue autolysis does not develop; moreover, an animal so treated possesses considerable subsequent immunity to injected tissue.

Since the toxic products of degenerated or destroyed tissue cells are an important factor both in disease and in surgical procedures, it has occurred to the author that this phenomenon may have an application in canine therapy.

Two mongrel dogs were injected three times a week with increasing doses of desiccated canine liver. A litter mate of each was injected similarly once a week. Tissue autolysis was maintained in the animals injected three times a week, and they showed clinical evidence of intoxication. The animals injected at weekly intervals remained in excellent physical condition.

Two weeks after this preliminary experiment was completed, one pair of dogs was given intravenously equivalent amounts of a suspension of *Salmonella enteritidis*. The animal originally injected three times a week died in three days; the one injected but once a week showed no outward symptoms. The other pair of dogs received intravenously maximum dosages of desiccated canine liver three times a week; the animal which had received the original injections thrice weekly died during the third week of this second series, while its litter mate showed no outward evidence of disease.

Similar results were obtained in chickens. As a possible application, Emmel suggests the immunizing in this manner of dogs used as blood donors, on the theory that the value of the blood transfusions from such animals would be enhanced.

[47] Emmel, M. W., 1941. The principle of tissue autolysis and its possible application in canine therapy. *J.A.V.M.A.* 98:767, pp. 134-137.

Normal canine liver is cut in thin slices, spread on a pane of glass, and dried in an oven at not more than 80°C. The desiccated tissue is pulverized so as to pass through a 200-mesh sieve.

For use, the desiccated tissue is triturated in a mortar with a few drops of physiological salt solution until it has the consistency of a smooth paste. Additional salt solution can be added as required for injections which are made intravenously, slowly.

The amount that can be injected initially depends largely upon the age and breed of the dog. There is also considerable individual variation. As the maximum dosage is approached, respiration is accelerated, may become irregular, may increase in depth, and in some cases is retarded. When any of these irregularities occur they are an indication to terminate the injection at once, as comparatively small additional amounts will induce immediate death. A two-month-old dog weighing 20 to 25 pounds should be able to stand an initial injection of 50mg of desiccated liver tissue. Subsequent injections should be made once a week, increasing the dosage 20 to 30mg each time. When the limit of toleration of this increase is reached (in a 25- to 30-pound dog, at about 200mg), the animal is immunized and of service as a donor in 10 days. The immunity apparently lasts for at least six months.

Intestinal Atony in Old Dogs[48]

The small animal practitioner is frequently faced with the problem of treating older dogs for constipation or obstipation. In most cases, it is best to give an enema of tap water followed by a dose of lentin, varying from 0.2 to 4.0cc. In cases of long standing, a second dose slightly smaller than the first is given 12 to 20 hours later.

For obstipation due to hairballs, a preliminary dose of light mineral oil is administered *via* the stomach tube, giving from one-half to six ounces of oil, according to the size of the subject. After the patient has been kept quiet for an hour, a subcutaneous injection of lentin is given.

In cases of bone impaction and hard fecal masses, an enema of water is given first, then oil *via* the stomach tube. A rest period of from one to three hours is followed by a minimum dose of lentin, and 20 minutes later an oil enema is given and the hind quarters are elevated for 10 to 15 minutes. Mechanical assistance is rarely necessary.

In some conditions, such as lumbago, defecation is suppressed because of the dog's reluctance to assume the characteristic position. In these cases a minimum dose of lentin is given every 24 to 48 hours.

[48] Ferguson, S. E., 1941. Intestinal atony in old dogs. *No. Am. Vet.* 22:6, pp. 361-363.

See also in VETERINARY MEDICINE:

February
Hematoma of the Brain of a Cat.....p. 112
Convulsions and Torticolis in a Cat...p. 113
Dislocation of Vertebrae in a Dog.....p. 115
Cystic Ovaries in a Bitch.....p. 115

March
Anesthesia in Small Animals.....p. 144
Role of Thiamin in Canine Nutrition...p. 156

April
"Canine Influenza" .....p. 216
Infectious Canine Leptospirosis.....p. 220
Canine Splenic Fibrosarcoma.....p. 226
Gastroscopy in Dogs.....p. 227

May
Libido in a Castrate Dog.....p. 259
Fibro-Adenoma in a Dog.....p. 259
Feline Gastric Ulcers.....p. 260
Trichomoniasis in a Puppy.....p. 261
Vitamin B Therapy in Leucoma.....p. 262

June
Treatment of Naphthalene Poisoning...p. 324
Leucemia in a Dog.....p. 325
Vitamin C and Barlow's Disease in Dogs.p. 329

July
Sulfapyridine for Canine Distemper....p. 365

August
Vaccine Dosage in Canine Distemper..p. 420
Canine Tetanus .....p. 434
Sulfapyridine for Feline Distemper.....p. 434

September
Ticks in Small Animal Practice.....p. 470
An Anomaly of the Foot in the Dog....p. 478

October
Omentopexy for Ascites in the Dog.....p. 519
Whipworm Hysteria in Dogs.....p. 522
Coxofemoral Dislocation in a Dog.....p. 523

November
Sulfaguanidine in Canine Coccidiosis..p. 580
The Treatment of Follicular Mange....p. 582

Poultry

Swine Erysipelas in Turkeys[49]

Outbreaks of swine erysipelas in turkeys have been reported from several widely-separated areas in the United States. Aside from its economic importance to turkey growers, this disease has a possible public health aspect in connection with human erysipeloid.

The epizootiology of the disease in turkeys is highly erratic. Soil appears to be the most logical reservoir for the organism; but nothing definite has been proved with respect to the method of transmission. In most of the outbreaks reported, there has been no possible contact with swine.

The great majority of birds affected are males. The most pathognomic lesion is a turgid, reddish-purple caruncle. The lesions most commonly encountered are intramuscular and subpleural ecchymotic and suffusion hemorrhages; these lesions are not confined to this infection, however, and positive diagnosis depends upon isolation and identification of *E. rhusiopathiae* from birds dead of the disease. In general, sudden losses of adolescent turkeys in good flesh with the lesions described point toward erysipelas, especially if the affected birds are mostly males.

No effective vaccine has been developed for turkey erysipelas. Treatment or prophylaxis with anti-swine erysipelas serum and sulfanilamide therapy have proved ineffective. At present, segregation of sick birds and slaughter for market of well birds appears to be the most economical method of handling outbreaks.

[49] Rosenwald, A. S., and E. M. Dickinson, 1941. Swine erysipelas in turkeys. *Am. Jnl. Vet. Res.* 2:3, pp. 202-213.

* * * *

Tests for Pullorum Disease[50]

The whole blood test is to be preferred to the tube test in pullorum disease control because, while the results are very similar, the former test is more economical. In a total of 3,861 tests, there was agreement in 92.41% by both methods. In constancy of diagnosis from the first to the second test, the results were slightly superior for the whole blood test in one series and for the tube test in another series. In each group the whole blood test gave more positive reactors than the tube test.

* * * *

Sulfathiazole for Coryza[51]

In a limited number of experiments, sulfathiazole in concentrations of 1, 0.5, and 0.25gm per 30gm of mash proved effective in preventing the development of clinical symptoms of coryza in chickens following inoculations of virulent cultures. The material also seemed to hasten the recovery of infected birds. It appeared to be effective only during the time the drug was being administered, indicating that the organisms are not all destroyed, but that they remain sufficiently retarded to prevent clinical symptoms.

[50] Gwatkin, R., and I. W. Moynihan, 1941. Comparison of the whole blood and tube agglutination tests for pullorum disease. *Sci. Agr.* 21:2, pp. 335-349.

[51] Delaplane, J. P., and H. O. Stuart, 1941. *J.A.V.M.A.* 99:772, pp. 41-42.

Transmission of T. Gallinae[52]

Trichomonas from the upper digestive tract of the chicken was transmitted by feeding cultures of the protozoon to the turkey, bobwhite quail, canary, and English sparrow, characteristic lesions being produced in these birds. A light infection without lesions was produced in one of 11 ducklings. An attempt to infect two ring-neck pheasants and a starling was unsuccessful.

In view of the similarity of morphology in a variety of natural hosts and ease of transmission from one natural host to another and to many species of birds in which natural infections have not been found, it is apparent that all the trichomonads so far reported from the upper digestive tract of birds belong to a single species, *T. gallinae*.

Tin Preparations for Tapeworms[53]

Ever since kamala has been shown to be unsatisfactory as a teniacide for poultry, there has been a need for an effective therapeutic agent to be used for expelling tapeworms from fowls.

In tests made by the Zoological Division of the Bureau of Animal Industry, it was found that a mixture of synthetic pelletierine hydrochloride and one of the tin compounds (tin oleate, stannous oxalate, stannous oxide hydrate, or stannous tartrate) was very effective in removing *R. cesticillus* and *H. carioca* from experimentally infected chickens, although neither the former nor the latter was very effective alone. The mixtures were somewhat irritating to the intestinal tract, but in most cases did not affect the birds adversely in therapeutic doses. A comparison of the data relating to efficacy and those relating to toxicity of the various combinations suggests that the mixture of tin oleate and synthetic pelletierine hydrochloride is the most promising of the preparations tested, but further work along these lines is necessary.

[52] Levine, N. D., L. E. Boley, and H. R. Hester, 1941. Experimental transmission of *Trichomonas gallinae* from the chicken to other birds. *Am. Jnl. Hyg.* 33:1, Sec. C, pp. 23-32.

[53] Guthrie, James E., and Paul D. Harwood, 1941. Use of tin preparations for the treatment of chickens experimentally infected with tapeworms. *Am. Jnl. Vet. Res.* 2:2, pp. 108-116.

Sulfaguanidine for Coccidiosis[54]

Preliminary experiments on the coccidiostatic effect of sulfaguanidine on coccidia of fowls indicate that this drug, in concentrations as low as 0.5% of the ration, prevented infection of chickens with *Eimeria praecox, E. mitis, E. maxima,* and *E. hagani.* Concentrations of 1% of sulfaguanidine in the feed were effective in reducing markedly the severity of cecal lesions due to *E. tenella,* and a concentration of 1.5% was similarly effective against *E. necatrix.* The feeding of the drug had no curative effect on chickens already infected with *E. tenella* and *E. necatrix.*

It appears that sulfaguanidine holds promise as a possible coccidiostatic agent for the control of all types of coccidiosis. However, until experiments are conducted to determine the effect of feeding this drug over long periods of time, decision as to its usefulness in the field must be reserved.

H. Meleagridis in Chicks[55]

Previous experiments by Hinshaw and McNeil have shown that it is possible to infect chicks with *Hexamita meleagridis.* Further investigations resulted in the following findings:

H. meleagridis persisted in the bursa of Fabricius and cecal tonsils of chicks for at least 22 weeks when the initial inoculation was made in chicks under one week of age. Rectal inoculation proved the most efficient method for establishing the infection.

It was impossible to produce symptoms of infectious catarrhal enteritis in chicks by serial passages in them. The degree of infection in chicks was very light when compared with the number of organisms found in poults.

Normal chicks placed in a brooder with infected poults acquired the infection, as did normal poults placed in a brooder with infected chicks. The chicken must, therefore, be considered a potential carrier for *H. meleagridis.*

[54] Levine, P. P., 1941. The coccidiostatic effect of sulfaguanidine (sulfanilylguanidine). *Cor. Vet.* 31:2, pp. 107-112.

[55] McNeil, E., and W. R. Hinshaw, 1941. Experimental infection of chicks with *Hexamita meleagridis. Cor. Vet.* 31:4, pp. 345-350.

Etiology of Perosis[56]

It has been shown that perosis (slipped tendon) of chicks is due to a deficiency of manganese. However, it is not purely a manganese deficiency; the authors' experiments show that an unidentified organic factor present in the alcoholic extract of liver, though not in the aqueous extract, is involved likewise.

Chicks receiving a synthetic ration adequate in manganese but deficient in the organic factor developed perosis. Similarly, birds fed a diet deficient in manganese developed perosis even though the liver extract was given. When both were given, no perosis was produced.

On a diet of low manganese content the development of perosis was prevented by administration of the liver extract; when manganese was entirely withheld, the severity of the resulting perosis was reduced if the liver extract was given.

Rickets from Sulphur Feeding[57]

In a study of the influence of long-time feeding of sulphur, from 2 to 5% of flowers of sulphur and ground sulphur were added as supplements to a balanced ration to five lots of 50 chicks each and laying pullets from April, 1938, to July, 1939, without access to direct sunlight but with 1% cod-liver oil in the ration. The pullets laid well until January. Later, production declined, shell texture became poorer, many of the pullets were down with egg paralysis, and hatchability was lowered. Those receiving the largest amounts of sulphur were the most seriously affected. These conditions were not observed in control groups, and rapid improvement was shown by the treated groups after the sulphur feeding was stopped and direct sunlight administered. This indicates that it is an unsound practice to feed from 2 to 5% of sulphur to laying pullets during the winter, when the potency of the sunlight is lessened.

[56] Hogan, A. G., L. R. Richardson, H. Patrick, and H. L. Kempster, 1941. Perosis due to a vitamin deficiency. *Jnl. Nutr.* 21, pp. 327-340.

[57] Holmes, C. E., J. G. Halpin, and C. A. Herrick, 1941. Rickets in laying pullets fed sulphur. *Poultry Sci.* 20:1, pp. 46-50.

Sulphur Therapy for Coccidiosis[58]

Flowers of sulphur, incorporated in the mash in the proportion of 5%, has been found to exert the same beneficial effect in avian coccidial infections with *Eimeria necatrix* as has been reported in infections with *E. tenella*.

When sulphur was fed regularly, beginning before the time of infection, mortality was prevented and the lesions in the intestines were slight. The controls suffered heavy mortality with severe intestinal lesions.

Flowers of sulphur had no value when fed to chickens already infected with *E. necatrix*. This was true whether or not the birds showed symptoms of infection at the time of beginning treatment.

The use of sulphur in the proportion of 5% of the ration for one week is recommended at the onset of an outbreak of coccidiosis due to *E. necatrix*. This treatment is advised as a temporary expedient to protect the birds while more permanent measures of sanitation are effected.

See also in VETERINARY MEDICINE:

February

Ammonia Fumigation for Coccidial Disinfection ..... p. 119

May

The Control of Avian Coccidiosis..... p. 263

June

Iowa Experiment in Disease Control.. p. 288

July

Tetrameres Americana Found in Eastern Cardinal ..... p. 373

Phenothiazine vs. Hemoglobin in Chickens ..... p. 375

Traumatism in Fowl Caused by Foreign Bodies ..... p. 379

Gapes in Chickens and Other Birds... p. 380

August

Eradicating Tuberculosis from Poultry Flocks ..... p. 392

A Probable Agent for the Transmission of Fowl Paralysis..... p. 435

September

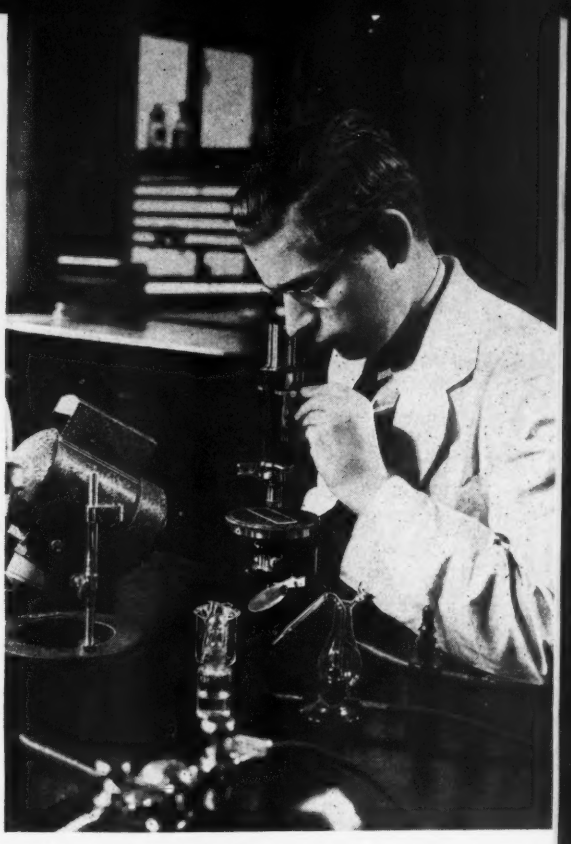
Salt Prevents Cannibalism..... p. 489

November

Infectious Bronchitis ..... p. 551

[58] Levine, P. P., 1941. Sulphur therapy in experimental avian coccidial infection with *Eimeria necatrix*. *Cor. Vet.* 31:2, pp. 120-126.

Technics and Miscellaneous



A Practical Dilution-Egg-Count Procedure[59]

Since the degree of infestation is of prime importance in judging the advisability of anthelmintic treatment, it is desirable for the veterinary practitioner to have available a method of determining the level of the worm burden that an animal is carrying. Stoll's dilution-egg-count technic, and even Gordon and Whitlock's modification of this, require more precision in application than is practical for the busy practitioner. The further modification proposed here is advocated as a practical aid to diagnosis and as a check on the efficacy of anthelmintics. It has the following advantages: The eggs are concentrated in a fairly small area, are separated from most of the fecal debris, and are easily and rapidly counted by even comparatively inexperienced workers.

Materials.—(1) Several half-pint milk bottles marked with a file to indicate 150cc capacity. (2) One or more graduated 1cc tuberculin syringes. (3) Saturated sugar or saline solution. (4) Small balance. (5) Microscope with mechanical stage. (6) Small tea strainer. (7) Several small beakers. (8) Special glass slide made as follows: An ordinary glass slide is broken into several small pieces. Two of these are glued by means of balsam to the ends of an ordinary glass slide. Another slide is attached to these supports, and the glass chamber thus formed is put aside until the balsam has set. This chamber is easily and safely washed in cool running tap water.

Technic.—(1) A 10gm sample of feces is broken into small pieces and a thick fecal suspension is made. Soft feces may be mixed directly with water; hard fecal matter must be soaked or ground up first. (2) Water is added up to the 150cc mark on the milk bottle and the thin suspension thus formed is stirred vigorously. (3) Approximately 10cc of this is poured into a small beaker through the tea strainer. (4) Exactly 0.5cc of the strained suspension is drawn into a graduated tuberculin syringe. (Because the needle holder fills with fluid, most tuberculin syringes contain 0.5cc if the fluid is drawn up to the 0.49cc mark; but this should be checked with each syringe used.) (5) Exactly 0.5cc of saturated sugar or saline solution is drawn into the tuberculin syringe. (6) An air bubble is drawn into the syringe, and the fecal suspension thoroughly mixed by tilting the syringe up and down. (7) After expelling approximately 0.2cc as waste, three 0.15cc

[59] Whitlock, J. H., 1941. A practical dilution-egg-count procedure. *J.A.V.M.A.* 98:771, pp. 466-469.

samples are expelled into the special glass slide. Meanwhile the suspension should be kept thoroughly mixed by tilting and rolling the syringe between expulsions. (8) The slide is placed in position on the mechanical stage of the microscope and allowed to remain unagitated for at least one minute, during which time the helminth eggs rise to the surface. (9) The upper surface of each of the three samples is scanned and the number of eggs for each sample recorded. (10) The average number of eggs per sample is determined; this number multiplied by 200 gives the number of eggs per gram of feces.

Taylor suggests the following as the egg per gram level which is to be considered dangerous:

Parasitic gastritis in lambs	2000-6000
Parasitic gastritis in cattle	300-600
Equine strongylosis	1500-2500
Ovine fascioliasis	300-600
Bovine fascioliasis	10-200

Flotation Solutions Compared[60]

A comparison of sodium nitrate, zinc sulphate, magnesium sulphate, sodium chloride, and cane sugar solutions with respect to their efficiency in the flotation test for parasite ova, showed that the sodium nitrate solution was superior, giving a higher count than any of the others, particularly with heavier ova. The ten-minute direct flotation method gave approximately twice as many ova as the five-minute; the direct centrifugal flotation method was superior to either.

Objectionable features of the sodium nitrate solution included the formation of bubbles and the floating of considerable debris, both interfering with the count of the ova. Care in stirring, or mixing the solution directly with the fecal material instead of with a fecal suspension, helps to control the bubbles. The presence of the debris may be partly overcome by spreading the material over the entire slide in order to make a larger area in which the ova can be seen.

[60] Koutz, F. R., 1941. A comparison of flotation solutions in the detection of parasite ova in feces. *Am. Jnl. Vet. Res.* 2:2, pp. 95-100.

Intravenous Anesthesia in Large Animals[61]

The advantage of intravenous over inhalation anesthesia is that it may be administered by the surgeon before beginning the operation, and he may then proceed with little or no further attention to it. Since most veterinarians must operate without the assistance of skilled anesthetists, this advantage is an important one.

In the adult horse chloral hydrate is the most satisfactory; it is reasonably cheap, stable, easily prepared and quite safe. A 12% solution has proved to be the most convenient. The injection must be strictly intravenous, as chloral hydrate is escharotic. The instruments necessary are a 14-gauge hypodermic needle 1½ inches long, a long 18-gauge needle with a closed end and two small side openings (a tomcat catheter), and a rubber injection outfit. For operations of short duration, the casting harness is applied and an area over the jugular vein and about two-thirds of the way up the neck is shaved and painted with tincture of iodine. The cork is removed from the bottle of chloral hydrate and the injection outfit attached. The jugular vein is distended with the left thumb and the 14-gauge needle inserted into the vein with a quick thrust. When blood flows freely through this needle, the long needle is inserted through it and along the jugular vein until its hub contacts the hub of the short needle. The bottle of chloral hydrate is inverted until some solution runs from the end of the injection outfit to free it of air; the end is then attached to the hub of the long needle. The solution should not be injected too rapidly as shock may be produced. The speed of injection can be slowed by finger pressure on the small tube that admits air to the bottle. When the horse has received enough of the solution, he weaves from side to side and goes down. Just before he falls, the needle may be removed from the vein. When the casting harness is tightened, the horse is ready for a minor operation.

For long and painful operations, a basal narcotic of chloral hydrate *via* stomach tube is given about 30 minutes before operating.

[61] Fowler, Geo. R., 1941. Intravenous anesthesia in large animals. *J.A.V.M.A.* 98:770, pp. 399-402.

For this, about one-half ounce of chloral to each 500 pounds of body weight is dissolved in lukewarm water. As the horse becomes quiet, he is cast and secured, and chloral hydrate is injected intravenously as described above. When nystagmus has practically disappeared and the corneal reflex is still present but much weakened, a stage of surgical anesthesia which will last 30 minutes or longer has been reached. Complete obliteration of the corneal reflex indicates profound anesthesia, a state close to the borderline of cardiac and respiratory failure. A 1,500 pound horse will usually require about 750cc of solution (1½ ounces of chloral hydrate by stomach tube and three ounces intravneously). More than this approaches the danger line.

Recovery is slower than following chloroform anesthesia, and the heat-regulating mechanism is seriously depressed. In cold weather the horse should be blanketed for several hours after the operation; in hot weather, heat prostration must be watched for. The pharyngeal reflex is depressed for some time, so feed and water should be withheld for four or five hours, or mechanical pneumonia may follow.

Nembutal has not been satisfactory for the adult horse, but it is excellent for colts up to six or seven months of age and especially for foals a few days to a few weeks old. It is injected slowly with a syringe. The average dose is 25cc, although for small foals as little as 5cc may be sufficient, and larger colts and ponies may require as much as 50cc.

In cows of the smaller breeds and in calves and heifers of the larger breeds up to 900 or 1000 pounds in weight, nembutal is satisfactory, except that in some cases the expense may be a disadvantage. The amount required for a medium-sized Jersey is from 75 to 125cc. The drug is injected into the jugular vein in the same manner as in the colt, except that it is usually preferable to cast the cow first. Disappearance of the corneal reflex is used as the indication of surgical anesthesia. Recovery takes longer than with chloral hydrate and the same precautions regarding blanketing in cold weather should be observed.

In larger cows and where the expense would make nembutal impractical, chloral hydrate may be used intravenously, employing the same general technic as for the horse. Large bulls of any breed and heavy beef cows are so susceptible to the toxic effects of any general anesthetic that its use should not be attempted.

In large swine, 10 to 20cc of nembutal injected intravenously into the marginal ear vein is quite successful. A glass syringe with a 20-gauge needle one inch long is used.

Chloral may produce either cardiac or respiratory failure or both; nembutal may depress the respiration until failure occurs. If toxic symptoms appear, removal of all restraint and cessation of surgical procedures are in order. Caffeine may be used as a stimulant.

Chemotherapeutic Testing[62]

The general advantages of the chick embryo as an object of experimentation have been pointed out repeatedly. Experiments concerning the therapeutic activity of sodium sulfathiazole on developing chick embryos infected with *Salmonella pullorum* and *Shigella flexneri*, indicate that they offer a convenient laboratory model for chemotherapeutic testing. Its usefulness is conspicuous in such cases as bacteria of the genus Shigella, for which no other convenient laboratory animal is available.

Transmission of Immunity[63]

It has been found that mother rats immune to *Trypanosoma lewisi* transmit an immunity to their young through their milk. Experiments were carried out to determine whether the same immunizing substance would appear in the milk of rats immunized by vaccines. The vaccines consisted of suspensions of 4,300,000 trypanosomes per cc of 0.5% formolized saline solution. Eight 0.1cc injections were given at three-day intervals. The immunity thus acquired was found to be transmitted to the young through the milk, as in the case of the naturally-immune mother rats.

[62] Weil, A. J., and L. S. Gall, 1941. Chemotherapeutic testing with sodium sulfathiazole in the developing chick embryo. *Jnl. Inf. Dis.* 69:2, pp. 97-101.

[63] Culbertson, J. T., 1941. Natural transmission of immunity against *Trypanosoma lewisi* from vaccinated mother rats to their young. *Jnl. Parasit.* 27, pp. 75-59.

P-Aminobenzoic Acid, a Vitamin[64]

Experiments to date seem to permit the conclusion that p-aminobenzoic acid is one of the factors of the vitamin B complex. It is a chromotrichia factor for the rat and a growth-promoting factor for chicks.

Coccidioidomycosis[65]

Coccidioidomycosis (coccidioidal granuloma) appears to be more or less indigenous to California, but it has been reported elsewhere. It has occurred in man, cattle, sheep, and dogs.

The gross lesions of the disease resemble those of tuberculosis or blastomycosis, and it should be kept in mind in diagnosing conditions in which the causative agents of the latter diseases cannot be found.

Coccidioidomycosis is caused by the fungus *Coccidioides immitis*. It multiplies in the body by endosporulation, a fact which assists in distinguishing it from the causative agent of blastomycosis, which multiplies by budding. In the tissues the microorganism is found as a highly refractile double contoured spherule, varying in diameter from five to 60 microns, which usually contains 100 or more spores. When mature the wall bursts and the spores are liberated. These are carried by the blood and lymph streams to different parts and establish metastases.

C. immitis is a strict aerobe, growing on practically any medium. On agar incubated at 37°C. colonies develop within three or four days. They are at first discrete, later becoming profuse and covering the entire plate. At room temperature colonies develop within six to eight days. Aerial hyphae are more abundant at lower temperatures. In liquid media true dichotomic branching mycelia have been noticed. Several carbohydrates are attacked, including arabinose, galactose, glucose, lactose, maltose, sucrose and xylose. Acid, but not gas, is formed. Gelatin is gradually liquefied.

Salmonella Types in Foxes[66]

In the routine examination of 286 specimen consignments of silver foxes, 149 were diagnosed as distemper, 28 as fox paratyphoid, and the remainder as miscellaneous disorders. The differentiation of distemper and fox paratyphoid on a gross pathological basis is difficult, especially in chronic cases.

Several types of Salmonella were reported, including *S. typhi-murium*, *S. cholerae-suis* var. kunzendorf, *S. anatum*, *S. pullorum*, and *S. newport;* this is the first time that the occurrence of the last two has been recorded in foxes. *S. typhi-murium* and *S. cholerae-suis* var. kunzendorf were the types most commonly encountered in fox paratyphoid and distemper.

Salmonella variants, some of them antigenically related to *S. typhi-murium*, were recovered from a large number of foxes.

On the basis of this investigation, *S. typhi-murium* and *S. cholerae-suis* var. kunzendorf should be further investigated to evaluate their pathogenicity for foxes.

Intraperitoneal Administration of Sulfanilamide[67]

Ten healthy dogs were injected with varying doses of aqueous suspensions of sulfanilamide crystals, the injections being made into the peritoneal cavity through the upper part of the left rectus muscle. Fifteen minutes after the injections the blood concentrations of the drug varied from 0.66 to 7.5mg %, depending upon the dosage.

Of the five animals receiving 0.3gm per kilogram of body weight, the maximum blood level was reached within two hours, the average being 4.99mg %. A maximum blood level of 6mg % was attained in the same length of time by two dogs receiving 0.6gm per kilogram of body weight. Of three dogs receiving 1gm per kilogram of body weight, one showed a maximum level of 18mg % in four hours, the second a maximum of 8.5mg % in six hours, and the third a maximum of 9.9mg % in 10 hours.

[64] Ansbacher, S., 1941. P-aminobenzoic acid, a vitamin. *Science* 93:2407, pp. 164-165.

[65] Plummer, P. J. G., 1941. Coccidioidomycosis in a dog. *Can. Jnl. Comp. Med.* 5:5, pp. 146-148.

[66] Bennett, McCoy, and Wisnicky, 1941. *Jnl. Inf. Dis.* 69:2, pp. 167-172.

[67] Keeley, J. L., 1941. Intraperitoneal administration of sulfanilamide: concentration in peripheral blood in dogs. *Proc. Soc. Exp. Biol. and Med.* 46, pp. 458-462.

These concentrations are lower than those previously reported following oral or subcutaneous administration of the drug.

Symptoms of toxicity were observed in two of the three dogs receiving the dose of 1gm per kilogram of body weight, but these disappeared within 12 hours.

Milk Control on the Farm[68]

There is no more important section of food control than the safeguarding of the milk supply. The following human diseases are capable of transmission through milk: bacillary dysentery, cholera, diphtheria, poliomyelitis, scarlet fever, septic sore throat, tuberculosis, typhoid and the paratyphoid fevers, and undulant fever. Pasteurization, although an important step in assuring the safety of the milk supply, does not obviate the necessity for healthy cows and the observance of rigid hygienic precautions in the production of pure, wholesome milk.

There must be careful supervision of the health of the cows and of their human attendants. Herds should be routinely tested by veterinarians for tuberculosis and brucellosis. In addition, there should be periodic examinations of the herd for any other abnormal conditions, and the proper measures taken when these appear. Should any abnormality be noted in the milk during milking or straining, such milk should be withheld from shipment and the cause investigated and corrected.

The dairy barn should be clean, dry, well lighted, and well ventilated. All interior surfaces should be as smooth as possible and tightly constructed. No dust or cobwebs should be allowed to accumulate, and the whole interior should be frequently brushed down and whitewashed at least twice a year. A good floor with adequate surface- and under-drainage is required. Concrete is the most satisfactory material for the floor.

In addition to being generously and regularly fed and watered, dairy cows must be kept thoroughly groomed. The udder, flanks and tail should be kept well clipped, and before milking these parts should be gone over with a clean, damp cloth, then dried.

The milker should wear clean clothes, preferably white overalls. He must wash his hands thoroughly just before milking. The milking stool, the last object handled by the milker before actually taking the teat in hand, must be kept scrupulously clean.

The milk pail should be of the small-mouthed variety.

The milk house should be located as close to the dairy barn as possible, and should be so equipped as to ensure prompt chilling of the milk to a low temperature and maintaining it there.

All dairy utensils must be kept clean. The following three steps are essential: (1) thorough washing (2) sterilization; (3) thorough drying after sterilization, except when utensils are to be used at once. Steam or hot water sterilization is effective when properly carried out, but few farms are equipped for this. Chemical sterilization gives good results when applied intelligently.

The Veterinarian's Role in the Conquest of Human Disease[69]

The veterinarian has contributed much to the health of the American people by the conservation of domestic live stock, thus assuring a wholesome and adequate supply of meat and milk for the consuming public, and by protecting the public from the diseases of animals that may be transmitted to man.

Food Supply.—An important function is the meat-inspection service administered by the Bureau of Animal Industry of the U. S. Department of Agriculture. Our federal meat-inspection service is probably the finest in the world. Its service in hygiene and sanitation is of incalculable worth to the health of the nation.

Tuberculosis.—The achievement of American veterinarians in practically eradicating bovine tuberculosis has been a notable one. As a consequence of this and of other measures carried out by veterinarians, physicians, and public health workers, the United States undoubtedly has the safest milk supply of any nation in the world.

[68] Lavery, J. F., 1941. Milk control on the farm. *Can. Jnl. Comp. Med.* 5:3, pp. 63-74.

[69] Feldman, William H., 1941. The veterinarian in the conquest of human disease. *J.A.V.M.A.* 98:769, pp. 304-309.

Rabies.—Rabies still constitutes a serious challenge. The rabies situation in the United States seems to be becoming more acute every year. There has been considerable controversy concerning certain recommendations advanced for the suppression of this disease, and it appears that until the responsibility for eradicating it is placed with some national agency, such as the federal Bureau of Animal Industry, we can expect no satisfactory solution of the problem. Rabies is fundamentally the responsibility of the veterinary profession, and it is important that this fact be recognized if we are to be rid of its menace.

Encephalitis.—Infectious equine encephalomyelitis represents a major problem in animal health, and perhaps in human health as well. The prevention and control of this disease in horses and in human beings provide an exceptional opportunity for the cooperative action of the veterinary and the medical professions.

Glanders, Brucellosis.—Many other diseases of animals which constitute a menace to human health have been either virtually eradicated (e. g. glanders of horses and mules) or prevented from becoming a major health problem by constant supervision (e. g. brucellosis).

Safeguards.—Although many of the contributions of the veterinary profession to the betterment of public health have come from veterinarians engaged in research, no small share of credit is due the practitioner. His alertness for danger signals constitutes an important phase of the protection of human health from infectious diseases—anthrax, glanders, foot-and-mouth disease, rabies, Weil's disease, mastitis, etc. The role of the veterinary practitioner in our program of public health is significant, and his contributions should be recognized and appreciated more widely.

In the conquest of disease the veterinarian has established a record of splendid achievement. To continue the attack and to maintain the objectives gained is an important part of every veterinarian's responsibility.

See also in VETERINARY MEDICINE:

January
Veterinary Service in the Preparedness Program ..... p. 12
February
Designs for a Small-Animal Hospital... p. 80
A Week of Winter Practice..... p. 98
Nicotinic Acid ..... p. 102
March
Big Game Animals Are Holding Their Own ..... p. 132
Vitamin B Complex..... p. 139
April
War and the Progress of Science..... p. 176
Phenothiazine ..... p. 182
Vitamin C and Miscellaneous Factors.. p. 194
Rickets in Silver Fox Pups..... p. 202
May
Many Factors in Anthelmintic Treatment ..... p. 238
Trembles (Milk Sickness) Produced by Toxic Butter ..... p. 244
Posterior and Anterior Pituitary Hormones ..... p. 246
The Removal of Cystic Calculi..... p. 254
Sulfanilamide in the Therapy of Actinomycosis ..... p. 274
Concentrated Blood Plasma for Shock. p. 275
June
Promoting Veterinary Service..... p. 296
Sulfanilamide Solution as a Topical Application for Infected Wounds..... p. 300
Chastek Paralysis a Vitamin B_1 Deficiency ..... p. 305
July
Experiences of a General Practitioner. p. 348
Thyroid and Parathyroid..... p. 368
Silk Sutures for Infected Wounds..... p. 384
August
The Adrenal Hormones..... p. 424
September
The Gonadotropes ..... p. 465
Sodium Citrate in Veterinary Therapy. p. 483
October
The Sex Hormones..... p. 514
November
Miscellaneous Hormones ..... p. 554
An Inexpensive Bacteriological Incubator ..... p. 567

"The sons of science walk in endless line bearing a torch . . . Their quests are strange and wonderful; to know the *what* of every living thing, and then the *how* and *why*."

—Paul H. Oehser.

A

Abortion in Cows, 184, 577
in Ewes, 607
in Mares, 452, 591
Abscesses in Cats, 50
in Sheep, 609
in Swine
Acetonemia in Cattle, 569, 600
Acriflavine for Mastitis, 597, 598
Actinomycosis in Dogs and Cats, 484
Sulfanilamide for, 274
Adermin, 139
Adrenal Cortex Extract, 387, 424
for Shock, 429, 576
Adrenal Hormones, 424
Adrenalin—*See* Epinephrine
Adulteration of Food, 438
Afterbirth—*See* Retained Placenta
Agalorrhea in Cows, 225, 482
Age of Farm Animals, Bulletin on, 334
Air Raid Precautions for Animals, 9
Alabama Polytechnic Inst. Faculty, 283
Alcoholization for Lameness, 327
Allergies, Histaminase for, 155
American Foundation for Animal Health, 73
A.M.A., Reading Lists of, 2
Statistics about, 341
American Society of Veterinary Therapy—*See* Practitioners' Association
A.V.M.A., Axby on Exec. Board of, 73
Contrasted with A.M.A., 341
Dog Food Program, 294, 344, 397
Hardenbergh Exec. Sec. of, 2
Indianapolis Meeting of, 293, 343, 396, 397, 491
Ammonia Fumigation for Coccidia, 119
Analeptics, 154
Anal Glands, Impaction of, 43, 44
Removal of, 74
Anaplasmosis in Cattle, 316, 527, 602
in Swine, 241
Transmission of, 602
Anaplasmosis-Like Disease, 108
Anatoxin, Staphylococcus, 383
Tetanus, 234, 382, 483
Androgens, 514
Anemia, Equine Infectious, 306, 310, 410
in Swine, 36
in Small Animals, 41
Anesthesia, Blood Changes During, 146
Chloral, 500, 624
Gastrointestinal Changes During, 147
in Large Animals, 500, 624
in Small Animals, 144
Intravenous, 624
Aninsulin in Lymphangitis, 276
Antelopes, Number of in U. S., 132
Anthelmintics for Cats, 56
for Cattle, 183, 312, 604
for Dogs, 56, 522
for Horses, 182, 188, 287, 430, 481, 557, 593
for Poultry, 56, 183, 374, 621
for Sheep, 28, 183, 272, 486, 502, 609
for Swine, 57, 183
Anthelmintic Treatment, Factors in, 238, 604
Anthrax in Horses, 95
in Texas, 571
Anticoagulants, 181, 483, 486
Anti-Erosion Factor, 143
Antiseptics, Number of, 230
Argentine Beef Quarantine, 68
Army, Cavalry Training in, 546
Horses and Mules for, 173, 335
Maneuvers, 541
Medical Care, 437, 540
Medical Library, 299
Report on Growth of, 584
Veterinarians in, 336
Veterinary Service, 12, 437, 445, 585
Yellow Fever Inoculation in, 540
Arthritis in Swine, 39, 67, 108
Artificial Insemination, 236
Ascariasis in Cats, 50
in Dogs, 56
in Swine, 57
Ascites, Correction of, 519
Ascorbic Acid, 194
Deficiency in Cats, 260
Deficiency in Dogs, 329
for Sterility in Bulls, 59, 179
for Sterility in Cows, 236
Aspergillosis in Poultry, 54
Aujeszky's Disease—*See* Pseudorabies
Avitaminoses—*See* Vitamin Deficiencies
Azoturia, Treatment of, 482

B

Balano-Posthitis in Sheep, 609
Barbiturates, 144
Barlow's Disease in Dogs, 329
Bears, Number of in U. S., 132
Big-Game Animals, Numbers of, 132
Blacktongue in Dogs, 104
Blood, Ca-P Content of Equine, 592
Changes During Anesthesia, 146
Changes in Hog Cholera, 510
Effect of Phenothiazine on, 374, 481
Blood Transfusion, History of, 548
Anticoagulants for, 181, 483, 486
Convalescent Blood for, 549
Equipment for, 549
for Anaplasmosis, 316
in Dogs, 616, 549
in Horses, 327
in Veterinary Practice, 549
Plasma for, 69, 275, 549
Sulfanilamide to Preserve Blood for, 7
Blue Bugs and Fowl Paralysis, 435
Book Reviews
Animal Pathology, 436
Boston Terrier, The, 583
Diseases of the Pig and Its Husbandry, 120
Diseases Transmitted from Animals to Man, 277
Essentials of Nutrition, 278
First Aid to Dogs and Cats, 583
History of Pharmacy, 330
Identification and Life Cycles of Parasites Affecting Domestic Animals, 66
Magic in a Bottle, 333
Man's Greatest Victory Over Tuberculosis, 65
Milk Sickness Caused by White Snakeroot, 384
Photodynamic Action and Diseases Caused by Light, 228
Plague on Us, 535
Public Administration Organizations, 279
Relation of Diseases in Lower Animals to Human Welfare, 334
Surgeon Reflects, A, 536
Taber's Cyclopedic Medical Dictionary, 279
Training the Dog, 280
Vitamins and Hormones, 584
Brain Abscesses in Sheep, 609
Surgery in the Cat, 112
Bronchitis in Chicks, 551
in Swine, 36
Brooder Pneumonia—*See* Aspergillosis
Brucella Antigen, Production of, 339
Brucellosis, Bovine, 20, 24, 25, 26, 27, 184, 440
Bulletin on, 321
Control in Norway, 117
Control in Ontario, 185
Control in U. S., 8, 440
in Swine, 40, 533
Nostrums Ineffective for, 131
Public Health and, 6, 57, 483
Buffaloes, Number of in U. S., 133
Bulldog Calf, 578
Bulls, Handling of, 350
Sterility in, 179
Butter, Improvement of, 337

C

Calcium Deficiency in a Colt, 378
Deficiency in Cats, 41
in Swine Rations, 544
Therapy for Cats, 41
Therapy for Cattle, 61
Therapy for Horses, 534
Calculi, Urinary, 254
Calf, Bulldog, 578
Calf Diphtheria, Sulfapyridine for, 62
Calfhood Vaccination, 20, 24, 25, 26, 184
Calves, Anthelmintic Treatment of, 604
Birth Weight of, 435
Necrotic Laryngitis in, 577
"Canine Influenza," 216
Cannibalism in Game Birds, 73
in Hens, 533
Salt for, 489
Carcinoma in a Cat, 380
in a Dog, 381
in a Mare, 110
Carotene in Forage Crops, 275
Castration of Boars, 38
of Cats, 443
of Dogs, 405
Cats, Abscesses in, 50
Actinomycosis in, 484
Anemia in, 41
Ascariasis in, 50
Brain Hematoma in, 112
Carcinoma in, 380
Coccidiosis in, 50
Convulsions in, 113
Distemper in, 50, 434
Eclampsia in, 41
Enteritis in, 50
Gastric Ulcers in, 260
Gastroenteritis in, 92
Hookworm in, 50
Influenza in, 92
Nicotinic Acid Deficiency in, 77
Nutritional Ills in, 41
Posterior Paralysis in, 41
Spaying Operation in, 443
Tapeworm in, 50
Teniacides for, 56
Torticolis in, 113
Cattle, Acetonemia in, 569, 600
Anaplasmosis in, 316, 527, 602
Anesthesia in, 624
Artificial Insemination in, 236
Ascorbic Acid for, 59, 179, 236
Breeding Efficiency of, 59
Brucellosis in, 20, 24, 25, 26, 27, 184, 440
Calcium Therapy for, 61
Calculi in, 254
Choke in, 223
Coccidiosis in, 199
Degenerated Tendons in, 529
Diaphragmatic Hernia in, 172

Cattle (Cont'd)
Diphtheria in, 62
Dystocia in, 88, 172, 560
Epsom Salt Poisoning in, 273
Foreign Bodies in, 383
Founder in, 90
Gangrenous Mastitis in, 109
Gas Gangrene in, 329, 484
Gestation Period of, 435
Hair Balls in, 446
Heat Resistant, 395
Hematoma in, 528
Hemoglobinuria in, 570
"Holding up" of Milk in, 225, 482
Injured by Starlings, 432
Liver Abscesses in, 235, 387
Lymphoblastoma in, 406
Mastitis in, 109, 232, 326, 415, 597, 598, 600
Milk Fever in, 61, 93, 266
Milk Secretion in 232
Nitrate Poisoning of, 62
Number of, 394
Nutrition of, 58, 70
Nymphomania in, 530
Occlusion of Vagina in, 172
Pericarditis in, 362
Phenothiazine for, 183, 312
Plants Poisonous to, 474
Profits from Dairy, 446
Puzzling Death of, 431
Pyometra in, 118
Rabies Vaccination for, 117
Radial Paralysis in, 480
Retained Placenta in, 89
Rumenotomy in, 364
Ruptured Omasum in, 187
Screwworm in, 376
Shipping Fever in, 138, 596
Sodium Chlorate Poisoning in, 318
Sterility in, 179, 236, 577
Sulfapyridine for, 604
Sweet Clover Disease in, 181
Tibial Fractures in, 319
Traumatic Gastritis in, 362
Trembles in, 136, 244, 384
Trichomoniasis in, 383
Tuberculin Testing in, 29
Tuberculosis in, 28
Twenty-eight-Hour-Law for, 30
Uterine Torsion in, 579
Vitamin C for, 59, 179, 236
Wobbles in, 507
Cavalry School at Ft. Riley, 546
Cavalry, Value of, 547
Census, Live Stock, 394
Cesarean Section in Dogs, 47, 76
Chastek Paralysis of Foxes, 177, 305
Cheese from Pasteurized Milk, 117
Chick Anemia Factor, 198
Embryo as Testing Medium, 625
Chloral Hydrate Anesthesia, 500, 624
Choke, Gadget for Relief of, 223
Treatment for, 111
Choline, 143
Chondroma of Nasal Septum, 509
Coal-Tar-Pitch Poisoning, 37
Cobalt Deficiency in Sheep, 572
Coccidioidomycosis, 626
Coccidiosis, Avian, 263, 621, 622
Bovine, 199
Canine, 580
Feline, 50
Cod-Liver Oil, Supply of, 485
Colitis in Horses, 276
Colorado State College Faculty, 177
Colt, Ca-P Deficiency in a, 378
Labored Breathing in a, 545
Malignant Edema in a, 469
Community Organization for Health, 536
Sales Spread Disease, 447
Convulsions in a Cat, 113
in Pigs, 108
Cornell School of Nutrition, 540
Corpus Luteum Extract, 530
Cortin, 426
Coryza, Avian, 54, 620
Coumarin an Anticoagulant, 181
Cramp in Horses, 111
Creamery Industry Wakes, 337
Crooked Toes in Chicks, 4
Croupous Enteritis in a Stallion, 525
Crystal-Violet Vaccine, 30, 611
Cystic Calculi, Removal of, 254
Ovaries in a Bitch, 115
Cysts of Dogs, 43
Dentigerous, 224

D

Deer, Number of in U. S., 132
Dentigerous Cysts, 224
Dermatitis, Dusting Powder for, 347
Diagnosis, Importance of, 4
Diarrhea, Treatment of, 327
Digitalis, Massive Dose of, 111
Diphenylamine for Screwworm, 376
Dipping Solution for Cattle, 603
for Dogs, 126, 524
Dislocation, Coxofemoral, 523
Vertebral, 115
Distemper, Canine, 90, 216, 365, 420
Feline, 50
Dog Food, Proper Constituents of, 614
Testing Program, 294, 344, 397
Dogs, Actinomycosis in, 484
Anemia in, 41
Anesthesia in, 144
Anomaly in, 478
Ascites in, 519
Barlow's Disease in, 329
Blacktongue in, 104
Blood Transfusions in, 616
Calculi in, 254
Caloric Requirements of, 69
Carcinoma in, 381
Castration of, 405
Cesarean Section in, 47, 76
Coccidiosis in, 580
Copulation After Castration in, 259
Coxofemoral Dislocation in, 523
Cystic Ovaries in, 115
Cysts of, 43
Dipping Solution for, 126, 524
Distemper in, 90, 216, 365, 420
Duodenal Ulcer in, 581
Ear Operations in, 75, 127
Eclampsia in, 41
Encephalitis in, 618
Enteritis in, 42, 45
Entropion in, 405
Fibro-Adenoma in, 259
Fibrosarcoma in, 226
Fluid Therapy in, 61
Focal Infections in, 42
Follicular Mange in, 582
Gastroscopy in, 227
Heartworm in, 55, 274, 617
Hermaphrodite, 532
Hernia in, 531
Hypertrophied Prostate Gland in, 45
Identification of, 328
Impacted Anal Sacs in, 43, 44, 74
Impotence in, 45
Incidence of Rabies in, 117
"Influenza" in, 216
Legislation about, 285
Leptospirosis in, 49, 220
Leucemia in, 325
Leucoma in, 261
Leucoplakia in, 433
Litters, Large, in, 543
Naphthalene Poisoning in, 324
Nephritis in, 51
Nutrition of, 41, 156, 614
of War, 488
Oophoritis in, 531
Otorrhea in, 404
Posterior Paralysis in, 41
Pyometra in, 47, 531, 615
Rabies in, 48, 70, 386, 553
Sodium Citrate for, 483
Staphylococcus Infections in, 383, 615
Statistics about, 5
Sulfanilamide for, 48, 626
Sulfapyridine for, 48
Teniacides for, 56
Tetanus in, 434
Thiamin Requirements of, 156
Tick Dip for, 126
Ticks in, 470
Tissue Autolysis in, 618
Dogs (Cont'd)
Trichomoniasis in, 261
Tumors in, 43, 226, 259, 381
Vertebral Dislocation in, 115
Vitamin C Deficiency in, 329
War, 488
Whipworm Hysteria in, 522
Ducks, Depth of Dive of, 4
Dysentery in Swine, 100, 210
Dystocia in Cattle, 88, 172, 560

E

Eclampsia in Small Animals, 41
Eczema, Lotion for, 232
Edema, Malignant, 469
Egg Count, Parasite, 623
Production, Bulletin on, 436
Eichhorn Receives Award, 494
Elk, Number of in U. S., 132
Emphysema, Diagnosis of, 484
in a Horse, 109
Encephalitis, Canine, 618
St. Louis, 442
Encephalomyelitis, Equine Infectious, 444
and St. Louis Encephalitis, 442
Spread of Eastern, 339
Vaccination against, 339
Endocarditis in Animals, 328
in Swine, 611
Endocrine Therapy—*See* Hormones
Enteritis in Cats, 50
in Dogs, 42, 45
in Swine, 37, 209, 223, 447, 495, 612
Enterohepatitis, Mapharsen for, 574
Entozon for Mastitis, 326
Entropion Operation, 405
Epinephrine, 425
Epsom Salt Poisoning in Cows, 273
Erysipelas, Swine—*See* Swine Erysipelas
Erysipelothrix Infections, Human, 1
Erysipelothrix Rhusiopathiae, 610
Estrogens, 516

F

Factor R, 198
S, 198
U, 198
Farmer Miles, 86
Favus in Poultry, 54
Fever Therapy for Trichomoniasis, 8
Fibro-Adenoma in a Dog, 259
Fibrosarcoma in a Dog, 226
Filariasis, Canine, 55, 274, 617
Fistula of the Withers, 90, 357
Fleas and Dog Heartworm, 55
and Plague, 437
Flotation Solutions, 624
Fluid Therapy in Dogs, 61
Foals, Diseases of, 452, 592
Foreign Bodies in Cattle, 362, 383
in Fowl, 379
Formalin for Colitis in Horses, 276
Ft. Bliss, Organization at, 445
Ft. Riley, Cavalry School at, 547
Hunt Club at, 546
Founder in a Cow, 90
Fowl Paralysis—*See* Neurolymphomatosis
Foxes, Chastek Paralysis in, 177, 305
Rickets in, 202
Salmonella Infections in, 626
Thiamin Deficiency in, 490
Fracture of Tuber Coxae, 469
Tibial, 319, 530
Fuadin for Dog Heartworm, 274, 617

G

Game Birds, Cannibalism in, 73
Trichomonas in, 621
Gangrene in Pregnant Cows, 329
Sulfonamide Compounds for, 534
Vaccination against, 484
Gapes in Chickens, 380
Garbage Feeding, 34, 538
Gastric Secretion, 63
Ulcers in a Cat, 260

Gastritis, Traumatic, 362
Gastroenteritis in Swine, 36
Gastroscopy in Dogs, 227
Genetic Resistance, of Swine to Brucellosis, 40
Gizzard Erosion Factor, 143
Glandular Therapy—*See* Hormones
Goats, Indigestion in, 91
Gonadotropes, 465
Gonadotropin, Chorionic, 466
Equine, 467
Pituitary, 465
Goring, Abdominal Rupture from, 171
Gramicidin, 392
for Mastitis, 598
Grass Juice Factor, 198
Grasses, Carotene Content of, 542
Frosted Sudan Not Poisonous, 542
HCN Content of, 542
Productivity of, 1
Gravel in a Mare, 90
"Gray Eye"—*See* Iritis
Grayson Foundation, 1

H

Hair Balls, Collection of, 446
Heart Block in a Race Horse, 250
Heartworm, Canine, 55, 274, 617
Hematoma Diagnosis Questioned, 222
in Brain of Cat, 112
in a Cow, 528
Hemoglobinuria, Bovine, 570
Hem. Sep. and Fowl Cholera, 257
Heparin, 227, 496
Hereditary Immunity, 625
Hermaphrodite Dog, 532
Pig, 111
Hernia, Bovine Diaphragmatic, 172
Canine Perineal, 531
Equine Umbilical, 222
Hexamita Meleagridis in Chicks, 621
Histaminase for Allergies, 155
Histamine, Effects of Injected, 594
Hog Cholera and Pig Anemia, 613
Blood Changes in, 510
Cattle Quarantined for, 70
Control of, 35, 340
Crystal-Violet Vaccine for, 30, 611
from a Community Sale, 447
Vaccination, 101, 208
Hookworm in Cats, 50
in Dogs, 56
Hormones, Androgenic, 514
Anterior Pituitary, 248
for Impotence, 45
Gonadotropic, 465
Liver, 555
Miscellaneous, 554
Pineal, 556
Posterior Pituitary, 247
Splenic, 555
Veterinary Use of, 246
Horse of the Year, 73
Horses, Abdominal Rupture in, 171
Abortion in, 452, 591
and Mules, 389
Anthrax in, 95
Auricular Sound in, 250
Azoturia in, 482
Blood Transfusion in, 327
Breeding Program for, 590
Broken Wind in, 533
Calculi in, 254
Carcinoma in, 110
Chloral Anesthesia for, 500
Choke in, 111
Colitis in, 276
Color Transmission in, 8
Contracted Tendons in, 377
Croupous Enteritis in, 525
Dentigerous Cysts in, 224
Digitalis for, 111
Diseases of Newborn, 452
Dislocation of Patella in, 111
Encephalomyelitis in, 339, 442, 444
Fistulous Withers in, 90, 357
Fractures in, 469, 530
Gas Poisoning of, 533
Gravel in, 90
Impaction in, 94
Infected Cords in, 480
Infectious Anemia in, 306, 310, 410
Horses (Cont'd)
Interstitial Emphysema in, 109
Intravenous Anesthesia in, 624
in Warfare, 335, 339, 594
Lameness in, 327
Lymphangitis in, 276
Malignant Edema in, 469
Mange Treatment for, 138
Mineral Deficiency in, 378
Minerals in Blood of, 592
Nail Prick in, 258
Nicotine Poisoning in, 117
Paralysis of Penis in, 482
Periodic Ophthalmia in, 594
Phenothiazine for, 182, 188, 287, 430, 481, 557, 593
Pneumothorax for, 533
Potato Poisoning in, 559
Purpura in, 534
Restraint of, 352
Roaring Operation for, 360
St. Louis Encephalitis in, 442
Selenium Poisoning in, 326
Sodium Citrate for, 483
Strangles Therapy for, 435
Strongylosis in, 557, 593
Swine Erysipelas Infection in, 382
Tail Operations on, 358, 433
Tetanus Anatoxin for, 382
Tetany in, 88
Vicious, 328
Umbilical Hernia in, 222
Uterine Torsion in, 501
Vitamin A Requirements of, 544, 593
Horseflies Transmit Anaplasmosis, 602
Human Body, Composition of, 231
Humane Laws, Revision of, 30
Hunts at Ft. Riley, 546
Hydrocyanic Acid, Plants Containing, 67
Hypertrophy of Prostate Gland, 45
Hysteria Caused by Whipworms, 522

I

Ice Cream, Consumption of, 67
Immunity Transmitted to Young, 625
Impaction, Equine, 94
Impotence, Treatment of Canine, 45
Incubator, Bacteriological, 567
Indiana V.M.A., 404
Influenza, Canine, 216
Feline, 92
Insulin, 554
Iodine Requirements of Animals, 60
Iowa Experiment in Disease Control, 288, 340
Iowa State College Faculty, 439
Iritis and Paralysis in Chicks, 67
Iron in Molasses, 108

J

Jack, Sporotrichosis in a, 321
Jaundice, Canine—*See* Leptospirosis

K

K.C.V.C. Alumni Quarterly, 550
Kaolin for Enteritis, 42
Keratitis in Lambs, 322
Ketosis—*See* Acetonemia
Kidney Disease in Dogs, 51
Kinsley Labs. to "Corn States," 19

L

Lambs, Nutritional Keratitis in, 322
Overeating in, 606
Rations for, 168
Lameness, Alcoholization for, 327
Laryngitis in a Calf, 577
Lead Arsenate Non-Toxic for Swine, 40
Lentin for Horses, 525
Leptospirosis in Dogs, 49, 220
Leucemia in a Dog, 325
Leucoma, Vitamin B Therapy for, 261
Leucoplakia in a Dog, 433
Library Services, New, 299
Lice in Swine, 36, 241
Lipocaic, 554
Listerellosis in Sheep, 608
in Swine, 32, 36
Liver Abscesses in Cattle, 235, 387
Hormones, 555
Live Stock, Importance of, 19
Markets, 1, 68, 78, 124
Production, 394, 440
Sanitary Officials, 178
Trucking Regulations, 78
Locker Plants, Number of, 33, 338
Lymphangitis in Horses, 276
Lymphoblastoma in Dairy Cattle, 406

M

Mange, in Dogs, 582
in Horses, 138
in Swine, 36
Mapharsen for Enterohepatitis, 574
Margarine, Restrictions on, 284
Mastitis, Acriflavine for, 597, 598
Effects of Stripping on, 232
Field Test for, 597
Gramicidin for, 598
in Cattle, 109, 232, 326, 415, 597, 598, 600
in Sheep, 180
in Swine, 67, 108, 129
Microscopic Test for, 415
Novoxil for, 598, 600
Transmission of, 326
Meat for Millions, 584
for the Army, 124
Judging Contest, 19
Motion Picture on, 33
National Supply of, 19
Production in 1940, 124
Varied Cuts of, 67
Vitamin Content of, 6, 7
Meat Inspection, Federal 232
in California, 73, 338
in Sweden, 534
Medical Service, Group, 230
Merillat Golden Anniversary, 287
Methylene Blue for Nitrate Poisoning, 62
Michigan State College, Faculty of, 122
Veterinary Clinic at, 443
Veterinary Laboratory of, 492
Women Students at, 237
M. S. C. Veterinarian Staff, 233
Midwest Small Animal Assn., 74
Milk, Composition of, 227, 390
Contamination of, 338
Control on the Farm, 627
Effect of Minerals on, 329
Fat Content of, 329
Microscopic Inspection of, 415
Paper Containers for, 487
Pasteurization of, 487
Protective Value of, 438
Secretion Rate of, 232
Milk Fever—*See* Parturient Paresis
Milk Inspection in Sweden, 534
Milk Sickness, 136, 384
Produced by Toxic Butter, 244
Mineral Requirements of Animals, 58
Mink, Chastek Paralysis in, 305
Molasses in the Hog Ration, 59
Iron in, 108
Montana Live Stock Notes, 130
Moose, Number of in U. S., 133
Mosquitoes Transmit Anaplasmosis, 602
Mules and Horses, 389
Fistulous Withers in, 357
Hemorrhagic Septicemia in, 257
Mustard Gas and Army Animals, 533, 595
Mycoses of Chickens, 54

N

Nail Prick, Complications from, 258
Naphthalene Poisoning in a Dog, 324
N.A.B.A.I.V. Annual Banquet, 180
N-Butyl Chloride for Canine Whipworms, 522
for Ovine Parasites, 272
Nephritis in Dogs, 51

Neurolymphomatosis and Iritis, 67
  Transmission of, 435
Newspapers Say, 134, 242, 393
N.Y.S. Veterinary College Faculty, 7
Nicotine Poisoning in a Horse, 117
Nicotinic Acid, 102, 173
  Deficiency in Cats, 77
  for Swine Enteritis, 37
Nitrate Poisoning in Cattle, 62
Nodular Worm Complications, 449
Nose Prints for Identifying Dogs, 328
  for Identifying Sheep, 488
No-Splint Fracture Treatment, 523
Novoxil for Mastitis, 598, 600
Nymphomania in Dairy Cattle, 530

O

Obituaries
  M'Fadyean, Sir John, 175
  Roberts, Guy A., 550
  von Ostertag, Robert, 125
Odentomata in Horses, 224
Ohio State University Faculty, 337
Omentopexy for Ascites in the Dog, 519
Ontario Veterinary College Faculty, 69
Oophoritis in a Bitch, 531
Ophthalmia, Periodic, 594
Orchitis in a Jack, 93
Otitis in Dogs, 404
Otorrhea, Operation for, 404
Ovariotomy in Mares, 328
Overeating in Lambs, 606

P

P-Aminobenzoic Acid, 626
Pantothenic Acid, 141
  Deficiency, 537
Paralysis in Poultry, 67, 435
  in Small Animals, 41
  of Penis in Horses, 482
  Radial, in Cows, 480
Paraplegia in Cattle, 507
Parasites, Control of, 238
  Egg Count for, 623
  Flotation Test for, 624
  of Cats, 50, 56
  of Cattle, 312, 376, 604
  of Dogs, 55, 261, 274, 470, 522, 580, 582, 617
  of Poultry, 263, 373, 380, 621, 622
  of Sheep, 28, 272, 403, 449, 502, 609
  of Swine, 36, 57, 241, 538
Parathyroid Glands, 371
Parke, Davis & Co. 75th Year, 72
Parturient Paresis, Experience with, 266
  Treatment of, 61, 93
Pasteur, Career of Louis, 385
Pasteurellosis in Sheep, 180
Pellagra, Incidence of, 107
  Symptoms of, 103
Penicillin, Use of in Infections, 537
Pericarditis, Traumatic, 362
Perosis of Chicks, 622
Phenothiazine for Cattle, 183, 312
  for Horses, 182, 188, 287, 430, 481, 557, 593
  for Poultry, 374
  for Sheep, 28, 183, 486, 502, 609
  for Swine, 57, 183
  Relative Efficacy of, 502
  Toxicity of, 287, 374, 430, 448, 481
Phosphorus Deficiency in a Colt, 378
Pig Anemia, 207, 271
  and Hog Cholera, 613
Pig Scour, 207
Piles in Swine, 129
Pineal Hormone, 556
Plagues, History of, 388, 535
Plant Poisoning, 474, 507
Pneumonia in Swine, 36
Pneumothorax for Broken Wind, 533
Poisoning, Coal-Tar-Pitch, 37
  Hydrocyanic Acid, 67
  Lead-Arsenate, 40
  Naphthalene, 324
  Nitrate, 62
Poisoning (Cont'd)
  Phenothiazine, 430, 448
  Plant, 474, 507
  Potato, 559
  Selenium, 326
  Sodium Chlorate, 318
  White Snakeroot, 384
  Zamia, 508
Poisonous Plants, Bulletin on, 436
Poliomyelitis in Animals, 383
Polyarthritis in Swine, 39
Potato Poisoning in Horses, 559
Poultry, Breeding for Disease Resistance in, 552
  Bronchitis in, 551
  Cannibalism in, 73, 489, 533
  Coccidiosis in, 119, 263, 621, 622
  Control of Disease in, 288, 346
  Coryza in, 54, 551, 620
  Crooked Toes in, 4
  Foreign Bodies in, 379
  Gapes in, 380
  Hexamita Infection in, 621
  Iritis in, 67
  Mortality Increasing, 552
  Mycoses of, 54
  Number of, 4
  Paralysis in, 67, 435
  Perosis in, 622
  Phenothiazine for, 183, 374
  Production of, 394
  Psittacosis in, 387
  Pullorum Disease in, 31, 54, 620
  Sale of Diseased, 288
  Sanitation for, 52, 119
  Sulphur for, 622
  Teniacides for, 56
  Tetrameres in, 373
  Trichomonas in, 621
  Tuberculosis in, 28, 392
  Vitamin A for, 60
  Vitamin K for, 489
P-P Factor—*See* Nicotinic Acid
Practitioners' Association, The, 399
Pregnancy Disease in Sheep, 94, 272
  Test, Intradermal, 281
Progesterone, 518
Promin for Tuberculosis, 67, 281
Pseudorabies, Bovine, 601
Psittacosis in Poultry, 387
Psychic Disorders in Animals, 382
Public Health, Brucellosis and, 6, 57, 483
  Heroes, 338
  Home Cold Storage and, 33
  Milk and, 57, 627
  Trichinosis and, 35, 538
  Tularemia and, 438, 485, 603
  Veterinarians and, 123, 627
Pulling Contest, Winners of, 8
Pullorum Disease, in Turkeys, 31
  Tests for, 54, 620
Purpura, Equine, 534
Pyometra, in Cattle, 118
  in Dogs, 47, 531, 615
Pyridoxine, 139

Q

Quarantine, History of, 237

R

Rabies, British Unfamiliarity with, 9
  Capital Moved, 386
  Control, 3, 22, 48, 543, 568
  Incidence of, 117
  Notes on, 553
  Potency of Vaccine, 2, 618
  Vaccination, 70, 117, 295
  Virulence of Virus, 70
Range Paralysis — *See* Neurolymphomatosis
Reading Lists, A.M.A., 2
Recent Materia Medica
  Adrenal Hormones, 424
  Gonadotropes, 465
  Miscellaneous Hormones, 554
  Nicotinic Acid, 102
  Posterior and Anterior Pituitary Hormones, 246
  Sex Hormones, 514
  Thyroid and Parathyroid, 368
  Vitamin B Complex, 139
  Vitamin C and Miscellaneous Factors, 194
Renin, 555
Restraint of Large Animals, 352
  Stocks for, 376
Retained Placenta, Removal of, 89
Retention Cysts in Dogs, 43
Riboflavin, 173
Ributyl—*See* N-Butyl Chloride
Rickets, Fat as a Factor in, 274
  in Silver Fox Pups, 202
  Therapy of, 382
Roaring Operation, 360
Rocky Mountain Spotted Fever, 603
Rumenotomy in Cattle, 364

S

Salmonella Types in Foxes, 626
Salt for Cannibalism, 489
  for Enteritis, 223, 495
  for Gland Deterioration, 544
Sarcoma in Dogs, 43
Sawdust Concrete, 68
Screwworm Threatens Live Stock, 376
Selenium Poisoning in Horses, 326
Semen, Preservation of, 179
Sex Control, 33
Sex Hormones, 514
Sheep, Abortion in, 607
  Balano-Posthitis in, 609
  Brain Abscesses in, 609
  Cobalt Deficiency in, 572
  Enterotoxemia in, 606
  Identification of, 488
  Keratitis in, 322
  Listerellosis in, 608
  Mastitis in, 180
  N-Butyl Chloride for, 272
  Nodular Worms in, 449
  Number of, 67, 394
  Nutrition of, 164
  Phenothiazine for, 28, 183, 486, 502, 609
  Pregnancy Disease in, 94, 272
  Stimulation of Estrus in, 607
  Stomach Worms in, 403
  Vibrio Abortion in, 607
Shipping Fever in Cattle, 138, 596
Shock, Treatment of, 275, 576
Silk Sutures for Infected Wounds, 384
"Sirius Sentiment Series," 334
Skin Lotion, Veterinary, 232
Sodium Chlorate Poisoning, 318
  Citrate Therapy, 483
Southern V.M.A. Meeting, 3
Soy Beans, Vitamin Content of, 59
Splenic Hormone, 555
Splint for Cattle, 319
Sporotrichosis in a Jack, 321
Staphylococcus Infections, 383, 615
Starlings Injure Cattle, 432
Stomach Worms in Sheep, 403
Strangles, Sulfanilamide for, 435
Strongylosis, Equine, 557, 593
Stuttgart Disease—*See* Leptospirosis
Sulfadiazine, 486
Sulfaguanidine, 486
  for Canine Coccidiosis, 580
  for Fowl Coccidiosis, 621
  for Swine Enteritis, 612
Sulfanilamide for Actinomycosis, 274
  for Bovine Coccidiosis, 199
  for Canine Infections, 48
  for Gas Gangrene, 534
  for Heartworm, 274, 617
  for Mastitis in Swine, 129
  for Preserving Blood, 7
  for Strangles, 435
  Intraperitoneal Injection of, 626
  Local Application of, 281
  Pre-Operative Use of, 480
  Solution for Infected Wounds, 300
Sulfapyridine for Calf Diphtheria, 62
  for Canine Distemper, 365
  for Canine Senticemia, 48
  for Cattle, 604
  for Feline Distemper, 434
  for Gas Gangrene, 534
  for Necrotic Laryngitis, 577
Sulfathiazole, for Fowl Coryza, 620
  for Gas Gangrene, 534
Sulphur for Poultry, 622
Surgical Equipment, Sterilization of, 372

Sweet Clover Disease, Cause of, 181
Swine, Anaplasmosis in, 241
Anaplasmosis-Like Disease in, 108
Anemia in, 36
Arthritis in, 108
Bronchitis in, 36
Castration of, 38
Cholera in—*See* Hog Cholera
Coal-Tar-Pitch Poisoning in, 37
Convulsions in, 108
Deficiency Disease in, 545
Diseases of, 206
Dysentery in, 100
Endocarditis in, 611
Enteritis in, 36, 37, 495, 612
Erysipelas in—*See* Swine Erysipelas
Hermaphroditism in, 111
Lead Arsenate Non-Toxic for, 40
Lice in, 241
Listerellosis in, 32 ,36
Mastitis in, 67, 108, 129
Mineral Rations of, 544
Mixed Infection in, 447
Molasses for, 59
Number of, 394
Nutrition of, 270, 612
Phenothiazine for, 57, 183, 448
Piles in, 129
Pneumonia in, 36
Polyarthritis in, 39
Polyomyelitis in, 383
Posterior Paralysis in, 241
Practice, 270
Quarantine Restrictions on, 70
Resistant Strains in, 40
Thiamin Deficiency in, 490
Throat Abscesses in, 241
Trichinosis in, 35, 538
Umbilical Hernia in, 241
Vesicular Exanthema of, 34, 240
Vitamin E for, 533
Swine Erysipelas, 92, 213
Causative Organism of, 610
Disinfection for, 610
from a Community Sale, 447
in a Horse, 382
in Turkeys, 620
Serum-Culture Treatment for, 128
Urticarial Form of, 571
Sylvatic Plague, Spread of, 437

T

Tail Operations, 358
Setting on the Way Out, 433
Tapeworms of Cats, 50, 56
of Dogs, 56
of Poultry, 56, 621
Tendons, Contraction of Flexor, 377
Degeneration of Extensor, 529
Teniacides, 56
Tetanus, Canine, 434
Toxoid, 234, 382, 483
Tetany in a Mare, 88
Tetrameres Americana in Cardinal, 373
Texas A. & M. College Faculty, 231
Thiamin, Importance of, 286
in Canine Nutrition, 156
in Soy Beans and Cow Peas, 59
Thiamin Deficiency in Foxes, 305, 490
in Rats, 282
in Swine, 490
30th Veterinary General Hospital, 445, 541
Thrush in Poultry, 54
Thyroid Gland, 368
Thyroxin, 369
Tick Paralysis, 603
Ticks, Control of, 126, 470, 524, 603
Transmission of Disease by, 435, 470, 602, 603
Tin Preparations as Teniacides, 621
Tissue Autolysis in Dogs, 618
Tonsillar Infection in Dogs, 42
Torsion of Uterus in a Mare, 501
Instrument for, 579
Trembles, 136, 384
Produced by Toxic Butter, 244
Trichinosis, Incidence of, 485
in Swine, 35, 538
Report on, 584
Trichobezoars, Collection of, 446
Trichomoniasis, Fever Therapy for, 8
in Birds, 621
in Mexican Cattle, 383
in a Puppy, 261
Truth in Fabrics Bill Becomes Law, 72
Trypaflavin—*See* Acriflavine
Tuberculin Test, Efficacy of, 29
Johne's Disease and, 602
Tuberculosis, Avian, 28, 392
Bovine, 28
Promin for, 67, 281
Tularemia, 485
Food Transmission of, 438
Tick Transmission of, 603
Tumors in Cats, 380
in Cattle, 406
in Dogs, 43, 46, 226, 259, 381
in Horses, 110
Turkeys, Coccidiosis in, 263
Enterohepatitis in, 574
Production of, 4, 233
Pullorum Disease in, 31, 54
Swine, Erysipelas in, 620
Treatment of Trichomoniasis in, 8
28-Hour-Law, Amendment of, 30
Typhus, Canine—*See* Leptospirosis

U

U.S.L.S.S.A., 44th Meeting of, 20
University of California Veterinary College, 441
of Illinois Preprofessional Course, 441
of Pennsylvania Faculty, 391
of Philippines Faculty, 539
Urethrotomy in Large Animals, 255

V

Vaccination against Brucellosis, 20, 24, 25, 26, 483
against Canine Distemper, 90, 420
against Encephalomyelitis, 339
against Gas Gangrene, 484
against Hog Cholera, 30, 101, 341
against Rabies, 24, 48, 70, 117, 295
against Tetanus, 234, 382, 483
Vesicular Exanthema of Swine, 34, 240
Veterinarians and Live Stock Producers, 440
and Public Health, 123, 627
Placed in Deferred Classes, 336
Veterinary Award to Eichhorn, 494
Hospitals, 10, 79, 80
Legislation, 588
Litigation, 340, 341
Practice, Typical, 88
Practitioner, Experiences of, 348
Progress, Milestones of, 63
Publicity, 73
Scholarships, Latin-American, 231
Surgery in Wartime, 64
Team in Indiana, 714
Veterinary College, California Establishes, 441
of Eire, 180
of Pennsylvania, 77
Veterinary Colleges, 589
Entrance Requirements of, 77
Veterinary Corps, Canadian, 18
Reserve, 182, 336
U. S., 12, 437, 445, 585
Veterinary Faculty, Alabama, 283
Colorado, 177
Iowa, 439
Michigan, 122
New York, 7
Ohio, 337
Ontario, 69
Pennsylvania, 391
Philippine, 539
Texas, 231
Washington, 487
Veterinary Service, Army, 437, 445, 541, 585
Importance of, 1, 12, 296, 297
in Montana, 130
Italian, 119
Veterinary Student, Staff of, 285
Vitamin A for Cattle, 58
for Horses, 544
for Poultry, 60
from Forage Crops, 275
in Soy Beans and Cowpeas, 59
Vitamin A Deficiency in Cattle, 282
in Dogs, 282
in Horses, 593
in Lambs, 322
Vitamin B Complex, 139
Essential to Bacteria, 392
in Leucoma, 262
Vitamin B_1—*See* Thiamin
Vitamin B_3, 143
Vitamin B_4, 143
Vitamin B_5, 143
Vitamin B_6, 139
Vitamin C—*See* Ascorbic Acid
Vitamin D for Cattle, 59
Vitamin D Deficiency in Foxes, 202
in Young Animals, 68
Vitamin E and Brucellosis, 533
for Cattle, 59
Produced Commercially, 60
Vitamin F, 198
Vitamin H, 197
Vitamin K for Poultry, 489
Vitamin L, 197
Vitamin M, 197
Vitamin P, 196
Vitamins in Nutrition, Brochure on, 334

W

War, Dogs in, 488
Gas in, 533, 594
Horses in, 173, 335, 339, 594
Mortality in, 67
Scientific Progress and, 176
Washington State College Faculty, 487
Weil's Disease—*See* Leptospirosis
West Point, Establishment of, 233
Whipworm Hysteria in Dogs, 522
Whipworms in Dogs, 56
White Snakeroot Poisoning, 136, 384
Wilson & Co. Appoint Veterinarians, 71
Wobbles in Cattle, 507

Y

Yeast as Adjunct to Anthelmintics, 604
Yellow Fever Inoculation, 540

Z

Zamia Causes Wobbles, 507

An Asterisk (*) Signifies a Halftone

A

Abell, L. J., 391*
Abrams, Gustave G., 79
Alfredson, B. A., 122*
Allen, Theodore, 222
Amadon, R. S., 391*
Andberg, William G., 594
Anderes, R. L., 61
Anderson, Mary, 122*
Ansbacher, S., 626
Anthony, David J., 120
Appleby, Aaron, 300
Armistead, W. William, 231*
Armstrong, Fernando E., 199
Armstrong, George R., 260
Ascher, Margaret, 237*
Ashcraft, Derwin W., 337*
Ashworth, C. T., 275
Asmus, Henry, 7*
Atkinson, LeRoy, 325
Aujean, M., 327
Axby, J. L., 73*, 278*, 293*

B

Baboni, N., 383
Bain, A. F., 69*
Bain, L. R., 531
Baker, Douglas, 85
Baker, D. W., 7*, 604
Baker, E. T., 88, 90*, 262, 560
Baladad, Amado E., 539*
Bamford, R. M., 533
Bankowski, R. A., 54
Barger, J. A., 128*, 292*
Barto, L. R., 615
Batchelder, Ray M., 337*
Bateman, W. L., 49*
Batt, H. E., 69*
Batt, H. T., 7*
Bayles, G. W., 222, 579
Beach, J. R., 54
Beamer, F. V., 439*
Bean, C. W., 598
Beath, O. A., 62
Beaudette, F. R., 23*
Beck, J. D., 391*
Beer, W. L., 285*
Bell, Frank N., 487*
Bell, T. Donald, 607
Benbrook, E. A., 439*
Benbrook, S. C., 285*
Bergin, Betty, 122*
Bergman, H. D., 439*
Bertram, Cathryn, 122*
Best, C. H., 227
Betts, James G., 381
Biester, H. E., 32, 36, 439*
Biltz, R. O., 391*, 600, 604
Birch, F. M., 439*
Birch, R. R., 7*
Black, Charles E., 122*
Black, W. H., 435
Blohm, F. D., 439*
Blum, Harold F., 228
Bohart, Field, 440*
Bohstedt, G., 607
Boley, L. E., 600, 621
Bolin, F. M., 613
Boman, George, 283*
Boniece, Wm. S., 122*
Bonnett, Alberta, 177*
Booth, E. T., 391*
Booth, T. O., 178*
Botkin, G. E., 293*
Boucher, W. B., 391*
Bourne, R. F., 177*
Bowen, Leroy E., 9*
Bower, Charles W., 402*
Bowerman, W. D., 116
Boyd, W. L., 38, 594, 605
Boyer, P. D., 236
Bradley, W. B., 62
Brinker, Wade, 122*, 443*
Brion, A., 484
Brown, F. H., 293*
Brown, H. W., 274, 293*, 617
Brown, J. C., 435
Brown, Paul, 233*
Brown, R. V., 122*
Brown, Thomas G., 180
Brown, V. R., 69*
Bruce, K. L., 261
Brumley, Oscar V., 337*
Bruner, D., 7*
Brunett, E. L., 7*
Bryan, Arthur H., 365, 434
Bryan, C. S., 122*, 415, 567
Bryant, John B., 270*
Buckingham, D. E., 134
Bunag, Juan, 539*
Bunnell, W. A., 134
Burgos, Carlos X., 539*
Burns, Patton W., 231*
Burson, W. M., 257
Busby, Bernard, 258
Butler, W. J., 130, 131*, 177, 178*

C

Cabrera, Deogracias J., 539*
Cady, G. W., 340
Cairns, G., 69*
Cairy, Clyde F., 122*, 233*
Calhoun, Lois, 439*
Callison, J. F., 223
Cameron, Alne E., 180*
Cameron, H. S., 40, 612
Campbell, Mrs. D. M., 287*
Campbell, Hope, 237*
Campbell, H. C., 391*
Carey, J. W., 285*
Carlisle, B. E., 312
Carpenter, Cliff D., 23*, 263, 491*
Casida, L. E., 607
Catmur, B. G., 392
Caughman, Porter, 135
Chamber, E. E., 311
Chamberlain, F. W., 122*
Clark, C. F., 122*
Clark, Robert H., 578
Clarke, Maurice H., 583
Clemente, Charles S., 122*
Codd, R. M., 115, 259
Code, Charles F., 594
Coffin, D. L., 391*
Cole, C. G., 30, 611
Collet, C. C., 134
Collins, C. C., 434
Collins, D. H., 39
Collins, W. L., 134
Conklin, E. S., 122*
Connelly, James W., 57
Coombes, A. I., 202
Cooper, John, 82
Cope, H. E., 122*
Corbett, A. C., 122*
Cordy, D. R., 487*
Corfe, E. A., 439*
Cote, F. J., 69*
Cotton, Wm. E., 3*, 283*
Couch, James F., 244
Courtade, R., 435
Covault, C. H., 439*
Covington, N. G., 487*
Cowser, A. R., 469
Cox, B. F., 283*, 602
Cox, Carolyn R., 122*
Cox, Herald R., 538
Craige, A. H. Jr., 391*, 592
Cremona, P., 276
Cripe, J. J., 293*
Cross, Floyd, 177*
Cross, J. C., 435
Crossley, M. L., 442
Crossman, E. A., 21*, 181*, 279*
Cuff, Ray L., 30
Culbertson, J. T., 625
Cummin, Melville P., 543
Cunkelman, John, 122*
Curtin, C. L., 7*
Curzon, Elizabeth, 60
Cutler, E. C., 384
Cutter, Irving S., 282
Cutting, Windsor, 274

D

Dakan, Everett L., 337*
Danks, A. G., 7*
Dappen, B. E., 447*
Darby, C. W., 122*
Darlow, A. E., 607
David, L. A., 328
David, Tomas T., 539*
Davidson, W. B., 603
Davidson, W. G., 56
Davis, B. F., 440*
Davis, G. K., 37
Davis, R. W., 177*
Dedrick, Warren J., 380
DeFosset, A. J., 21*, 180*
Delaplane, J. P., 620
Denison, G. A., 117
Descazeaux, J., 435
de Tienne, T. A., 50
Devereux, E. D., 122*
Diaz, Vicente, 539*
Dick, G. A., 391*
Dickinson, E. M., 620
Diernhoefer, K., 382
Dills, M. J., 134
Dimock, W. W., 3*, 491*, 590
Dobson, C. C., 293*
Dobson, Leonard, 274
Dodds, Hilma, 439*
Doll, E. R., 122*, 492*
Donahoe, M., 447*
Donaldson, Joseph M., 122*
Donelson, C. C., 293*
Doyle, L. P., 293*
Dubois, C., 483
Dubos, R. J., 598
Duckworth, C. U., 178*
Dukes, H. H., 7*
Duncan, Glenn, 509
Dungan, Wm. M. Jr., 487*
Dunn, R. Clark, 231*
Dunne, H. W., 285*
Dunphy, J. E., 384
Durant, A. J., 373

E

Eads, Eugene, 233*
Ecker, W. R., 48
Eder, N. J., 272
Edgington, Bruce H., 337*
Eichhorn, Adolph, 494*
Eittreim, S. C., 285*
Elander, B. J., 49, 114
Ellis, C. C., 7*
Embree, W. J., 287*
Embree, Mrs. W. J., 287*
Emmel, M. W., 618
Emmerson, J. H., 522
Emmerson, M. A., 391*
Emrick, Bessie, 283*
Engle, J. B., 45, 47
English, Burt, 582
Eppson, H. F., 62
Erickson, C. F., 391*
Erickson, F. J., 122*
Errington, B. J., 188
Evans, W. M., 7*
Eveleth, D. F., 136, 449, 510
Ewen, Lloyd C., 17*
Eyestone, Hal, 532

F

Fabian, F. W., 122*
Fahlund, L. A., 233*
Fairbanks, B. W., 60
Farquharson, James, 62*, 596
Faulder, E. T., 178*
Feinberg, J. George, 115, 259
Feldman, L. W., 285*
Feldman, Wm. H., 29*, 281, 627
Ferguson, Jean, 7*
Ferguson, S. E., 619
Fernandez, Demetrio B., 526
Ferriols, Vicente, 539*
Fincher, M. G., 7*
Finkelstein, B. J., 615
Fisher, L. E., 285*
Fitch, C. P., 605
Fitzgerald, T. C., 283*
Flickinger, M. R., 285*
Flipse, Frank, 225
Floody, Robert J., 274
Fluharty, Dean, 233*
Flynn, J. C., 399*
Foley, R. James, 113
Folse, C. D., 430, 570
Ford, A. B., 135
Forland, L. M., 285*
Fosse, A. L., 87
Foster, Sam, 181*
Foust, Gene V., 337*
Foust, H. L., 439*
Fowler, G. R., 285*, 439*, 624
Fowler, W. J. R., 69*
Fox, H., 391*
Francis, A. H., 440*
Fraps, G. S., 60
Fraser, Willa, 177*
Frauchinger, E., 382
Frederick, L. D., 164, 170*
Freeman, V. A., 37
Frick, E. J., 133
Fries, Jack, 233*
Frost, J. N., 7*
Fuller, Stewart A., 610
Fulton, Marjorie B., 122*

G

Gadd, John D., 592
Gage, S. H., 7*
Gall, L. S., 625
Gambrel, Paul, 233*
Gardiner, M. R., Jr., 391*
Gasser, T. J., 391*
Gassner, Frank X., 177*
Gay, Carl W., 337*
Gay, W. J., 608
Gebhard, Wm., 122*
Gibbons, W. J., 7*
Giffee, Joe W., 129
Gillet, Ronny, 233*, 237*
Gilman, H. L., 7*
Giltner, Ward, 122*
Gish, John G., 320
Gleiser, Chester, 337*
Glew, R. E., 134
Glick, Dudley P., 177*
Glover, George H., 177*
Glover, W. G., 69*
Goffinet, L., 500
Goldie, W., 39
Gomez, A. K., 539*
Gonick, Walter N., 177*
Gonzaga, Arcadio C., 539*
Gorelick, Arthur N., 337*
Goss, Leonard W., 45*, 337*
Goss, W. J., 7*
Gow, R. M., 178*, 440*
Graham, Eleanor, 337*
Graham, Guy G., 181*
Graham, Robert, 37*, 601
Graves, Earl F., 489
Green, R. G., 305, 618

Greene, J. E., 283*
Gregoire, C., 329
Gregory, P. W., 40
Greiner, Norma, 237*
Grell, H. A., 285*
Griffiths, H. J., 439*
Griggs, Wilena, 439*
Grossman, J. D., 337*
Groves, Kermit, 40
Guard, Ada May, 177*
Guard, Willard F., 337*
Gullickson, T. W., 605
Guthrie, James E., 56, 621
Gutman, Julia Ann, 337*
Guyselman, P. C., 34
Gwatkin, R., 620

H

Habermann, R. T., 502, 593
Hagan, W. A., 7*
Haigler, S. W., 126*
Hall, M. C., 239
Hallman, E. T., 122*
Halpin, J. G., 622
Halverson, J. O., 59
Hamilton, C. M., 487*
Hamilton, H. Meade, 404*
Hammerly, Donald, 389
Hansen, H. S., 79
Hanson, John J., 597
Hantman, Harris W., 478, 519
Hardenbergh, John G., 2*, 293*
Harr, J. R., 54
Harris, Harriett, 237*
Harshfield, G. S., 177*
Hart, G. H., 593
Harwood, Paul D., 56, 57, 593, 621
Hatch, R. D., 439*
Hathaway, J. R., 182*
Haupt, H., 326
Hawking, F., 534
Hawkins, Philip A., 122*
Hawthorne, Geo. A., 401*, 612
Hay, James R., 600, 609
Hayden, C. E., 7*
Healy, J. H., 180*
Heath, M. K., 77
Heatley, T. G., 382
Heemstra, L. C., 502
Heise, R. W., 447*
Held, H. E., 285*
Helvig, Raymond, 285*
Helwig, John H., 337*
Hendershott, R. A., 178*
Henderson, J. A., 37
Hendricks, W. H., 21*, 178
Henkels, 64
Henry, C. W., 440*
Herman, A. A., 45
Herrick, C. A., 622
Hershey, S. E., 402*
Hester, H. R., 37, 621
Hewitt, E. A., 439*
Hill, J. M., 275
Hilston, N. W., 449
Hilton, S. L., 232
Hinkle, Earl, 293*
Hinshaw, H. C., 281
Hinshaw, W. R., 23*, 31*, 54, 621
Hobbs, Walter R., 55, 337*
Hoerlein, Alvin B., 177*
Hoffman, L. F., 447*
Hogan, A. G., 622
Holman, Emile, 274
Holmes, C. E., 622
Holstein, G., 383
Holth, H., 117
Hopkins, G. S., 7*
Horning, J. Gilbert, 155
Horton-Smith, C., 119
Houghton, H. R., 134
Houk, W. S., 182*
Howell, C. E., 593
Howell, D. E., 602
Hoyt, H. H., 285*
Huddleson, I. F., 122*, 299*
Hughes, E. H., 40
Hull, F. E., 609
Hull, Thomas G., 277
Humrich, Ralph, 122*
Hunt, W. Haward, 593
Hutchings, L. M., 122*
Hutton, J. P., 122*
Hylton, J. W., 285*

I

Immenschuh, Robert D., 322
Ingle, R. T., 69*
Ittner, N. R., 593

J

Jacobson, Olene, 447*
Jaggi, Fred P., 231*
Jennings, L. F., 567
Jennings, Wm. E., 15*, 452
Jensen, G. W., 608
Jensen, H. E., 285*
Jensen, H. P., 285*
Jerstad, A. C., 56
Johnson, H. E., 122*
Johnson, Harry W., 177*, 596
Johnson, Howard W., 283*, 602
Johnson, M. J., 439*
Jokerst, H. A., 182*
Jones, Charles, 378
Jones, E. E., 54
Jones, J. H., 391*
Jones, K. U., 126*
Jones, L. M., 439*
Jones, M. J., 182*
Jones, M. W., 285*
Judy, Will, 280
Jungherr, Erwin, 23*

K

Kadets, Martin, 111
Kalkus, J. W., 487*
Kamarov, O., 63
Kamarov, S. A., 63
Kanegis, L. A., 285*
Karlson, A. G., 610
Karnes, J. L., 578
Kays, John M., 557
Keeley, J. L., 626
Keller, E. J., 469
Kelley, Virgil R., 260
Kelly, F. H., 108*
Kelly, Steve, 233*
Kelser, R. A., 12*, 48, 287*, 334, 586*
Kelser, Mrs. R. A., 287*
Kempster, H. L., 622
Kennedy, Charles A., 379
Kenzy, S. G., 439*
Kepner, R. E., 293*
Kernkamp, H. C. H., 38*, 611
Ketchersid, James R., 48
Killham, B. J., 122*
Kingma, Fred J., 337*
Kingman, H. E., Jr., 71
Kinney, W. D., 340
Kinsley, A. T., 19*, 118, 138, 550*
Kiper, Ralph O., 83
Kleckner, A. L., 391*, 600, 604
Klein, L. A., 391*, 600, 604
Klimmer, M., 326
Knapp, Bradford, Jr., 435
Knapp, John H., 337*
Knapp, J. V., 27, 178*
Knight, D. R., 373
Knirk, Harold W., 443*
Knudson, Arthur, 274
Koch, J., 327
Koen, J. S., 128*, 292*
Koger, R. B., 110, 316
Kokx, Clavton E., 443*
Koll, C. H., 182*
Kortenber, John, 233*
Kostner, 118
Koutz, F. R., 337*, 470, 624
Kramer, S. D., 122*
Kremers, Edward, 330
Krill, Walter R., 337*
Krizenecky, Jaroslav, 329
Kroner, T. D., 177*
Krumbhaar, E. B., 391*
Kurtz, M. B., 122*
Kuzewski, Henry J., 231*

L

Laird, Glover, 319
Lambert, W. V., 435
Landron, A., 383
Lanford, Caroline Sherman, 278
Lange, Stephen W., 231*
Langham, R. F., 122*
Lardy, H. A., 236
Larson, V. S., 178*
Lavery, J. F., 627
Leach, C. N., 117
Lee, A. M., 607
Lee, W. F., 134
Lee, W. J., 391*
Leith, T. S., 439*,
Lekwa, C. L., 448
Lemen, Clifford A., 380
Lemétayer, E., 382, 483
Lenert, August A., 231*
Lentz, F. E., 391*
Lentz, W., 533
Lentz, William J., 391*
Levine, Leo, 443*
Levine, N. D., 621
Levine, P. P., 621, 622
Lewis, H. V., 134
Lewis, W. K., 178*
Lewitus, Victor, 102, 139, 194, 228, 246, 368, 424, 465, 514, 554, 584
Lichlyter, Frank, 226
Lightcap, G. C., 285*
Line, C. B., 122*
Little, R. B., 598
Little, S. W., 80
Live, I., 391*
Livingston, Steele, 487*
Llewellyn, Lew, 285*
Lortz, H. P., 285*
Lotze, John C., 602
Love, W. Graham, 594
Lucas, J. Wiley, 287*
Lucas, Mrs. J. Wiley, 287*
Luisada, Aldo, 250
Lyman, John F., 337*
Lytle, W. H., 135

M

McAdory, I. S., 3*, 21*, 178*, 283*
McBryde, C. N., 30*, 181*, 611
McCallum, Jean, 237*
McClelland, E. S., 285*
McClelland, Robert B., 43, 433
McCoy, J. E., 487*
McCoy, John W., 433
McCulloch, Ernest C., 40, 487*, 574, 610
M'Fadyean, Sir John, 175*
McGilvray, C. D., 69*, 184*
McGinnis, C. L., 74*, 76*
McGregor, W. Alan, 26
McIntire, J. C., 285*
McIntosh, J., 534
McIntosh, R. A., 69*
McKee, G. S., 113
McKenney, F. D., 487*
McKillip, Geo. B., 287*
McKillip, Mrs. Geo. B., 287*
McMillan, H. L., 447*
McNeil, E., 31, 621
McNutt, S. H., 439*
McOmie, W. A., 612
McPeek, Raymond, 199
MacBrayer, R., 45
Mace, Don L., 594
MacQueen, J. W., 77
Madsen, L. L., 37
Magrane, H. J., 134, 404*
Magrane, M. G., 134
Mallmann, W. L., 122*
Manges, J. D., 42
Manley, David O., 582
Mannasmith, C. H., 285*
Markham, Floyd S., 337*
Marold, G. J., 172
Marsh, Edward T., 337*
Marsh, H. L., 285*
Marsteller, Ross P., 231*
Martin, H. M., 391*
Martin, J. Holmes, 23*, 552
Mason, Earl E., 292*
Matischeck, P. H., 609
Matson, C. A., 182*
Mauger, Harry M., Jr., 337*
Meads, E. W., 317*
Medaris, Jack, 171
Melles, L. H., 285*
Mensalvas, Faustino S., 539*
Merchant, I. A., 439*, 610
Merillat, L. A., 287*
Merillat, Mrs. L. A., 287*
Merillat, L. A., Jr., 287*
Merillat, Mrs. L. A. Jr., 287*
Meriweather, Bert, 375
Merrick, A. C., 75
Merrill, C. M., 524
Merritt, W. E., 236
Mesenbrink, Roy L., 172
Meyer, Lois, 439*
Miles, T. C. ("Farmer"), 87*
Milks, H. J., 7*, 43*
Millen, T. W., 510
Miller, A. W., 180*
Miller, M. E., 7*
Miller, W. T., 326, 598
Miller, W. W., 122*
Milliff, John H., 231*
Milligan, J. G., 602
Mills, John W., 337*
Miner, M. L., 285*
Mitchell, A. K., 19
Mitchell, A. O., 109
Moe, L. H., 135, 602
Mohler, John R., 24*, 281, 334, 536, 587*
Molina, A., 117
Moore, Hamlet, 126*
Moore, L. A., 275
Moore, Mildred, 283*
Moore, William, 178*
Morcos, Zaki, 95
Morrill, C. C., 601
Morrill, Don, 233*
Moseley, Edwin L., 384
Moses, H. E., 282
Mosher, J. H., 134
Mostyn, H. J., 144
Mott, L. O., 306
Moynihan, I. W., 620
Muirhead, E. E., 275
Mull, Norma, 122*
Mundhenk, Russell L., 231*
Mundt, J. O., 122*
Munger, Myrtle, 122*
Munson, W. L., 285*
Murphy, J. H., 100
Murphy, James M., 597
Murray, Charles, 25*, 439*
Myers, J. Arthur, 65

N

Nance, Mrs. Harold, 283*
Nelson, J. W., 605
Neu, Lisa, 122*
Newhart, Charles C., 530
Newsom, I. E., 177*
Nicholson, Lyle G., 487*, 574
Nielsen, E. L., 136
Nielsen, W. M., 111
Niemever, W. E., 54
Nix, James Thomas, 536
Norden, C. J., 285*

O

O'Connor, J. J., 180
Odom, Houston, 283*
Ogden, H. D., 285*
O'Harra, J. L., 285*
Okliesa, B., 328
Olafson, Peter, 7*
Olney, J. F., 52
Orum, A. M., 285*
Osteen, O. L., 306
Ott, G. L., 202
Ozier, Terry S., 231*

P

Paabo, A., 533
Packer, R. A., 439*
Paige, Robert N., 279
Palmer, L. S., 605
Parker, W. B., 73
Parkhurst, Benjamin R., 443*
Pasteur, Louis, 385*
Paterson, J. S., 382
Patrick, H., 622
Patton, John W., 156, 492*
Paul, E. M., 84
Péan, H., 482
Peck, Ed, 174*
Peck, Elizabeth, 174*
Perry, J. K., 49
Perry, Vincent, 583
Phillips, Paul H., 59, 236
Phillips, Ralph W., 485
Pinkerton, H. E., 447*
Place, Frank, 447*
Plummer, P. J. G., 626
Pomeroy, M. E., 128*
Port, H. D., 20*, 21*, 178*, 180*
Port, Rodney I., 262
Prat, M. J., 329
Preneron, Jean, 327
Price, R. B., 285*
Prickett, C. O., 283*

R

Radakovich, Mildred, 372
Ramon, Gaston, 234*, 382, 483
Rawson, D. W., 285*
Rebrassier, R. E., 66, 337*
Redman, Harold, 122*
Redmond, Harold E., 231*
Reed, Myron D., 481
Regan, Joseph C., 227
Renfrow, Charles, 187
Rich, George C., 231*
Richardson, D. F., 135
Richardson, L. R., 622
Richou, R., 383
Rinehart, H. C., 178*
Riser, Wayne H., 74*, 76*
Roberts, Guy A., 507, 550*
Roberts, Irving, 233*
Robertson, Harry J., 616
Robinson, M. O., 283*
Robinson, Virgil B., 557
Roseboom, B. B., 122*
Rosenberger, Maynard, 25
Rosenwald, A. S., 620
Rothermel, R. O., 134
Rover, H. K., 391*
Rubin, H. Louis, 231*
Ruhland, H. H., 122*, 492*
Runnells, Russell A., 436, 439*
Ryff, J. F., 122*, 607

S

Sadow, I. J., 532
St. Clair, L. E., 439*
St. John, J. L., 40
Sales, E. K., 122*, 404*, 443*
Sampson, Jesse, 600
San Agustin, Gregorio, 539*
Sandberg, I., 534
Schaffer, Jacob M., 56
Schalk, Arthur F., 337*
Schalm, O. W., 597
Scheidy, S. F., 391*
Schendel, Samuel A., 528
Schindler, Rudolph, 227
Schloemer ,George C., 325
Schlotthauer, Carl F., 46*, 614
Schoening, H. W., 22*
Schofield, F. W., 69*
Schornagel, H., 328
Schwarte, L. H., 32, 36, 439*, 510
Schwartz, Benjamin, 32*
Scott, A. M., 285*
Scott, J. P., 391*
Scrivner, L. H., 607
Seeley, Alice, 177*
Seidell, H. A., 128*, 178
Seiden, Rudolph, 61
Selbie, F. R., 534
Self, R. A., 134
Senior, G. B., 292*
Severin, J. E., 51
Severson, A. S., 613
Sheldon, A. J., 274, 617
Sherman, Henry C., 278
Sherwood, F. W., 59
Sherwood, R. M., 60
Sholl, L. B., 122*
Shorb, D. A., 502
Shore, H. J., 3*, 128*, 181*
Sigler, T. A., 225, 254, 287*, 295*, 348*
Sigler, Mrs. T. A., 287*
Silverman, Milton, 333
Simms, B. T., 283*
Sloss, Margaret, 439*
Smith, Charles C., 273
Smith, C. Harvey, 293*
Smith, Charles L., 530
Smith, D. A., 41*, 439*
Smith, Geddes, 535
Smith, H., 59
Smith, Hilton A., 177*
Smith, H. C., 42, 447*
Smith, K. W., 177*
Smith, R. H., 237
Smith, R. W., 178*
Smith, Velma, 439*
Smith, Walter F., 293*
Snyder, R. C., 391*
Snyder, W. W., 275
Solandt, D. Y., 227
Solis, Jose A., 539*
Sollier, N., 483
Spence, C. J., 287*
Spence, Mrs. C. J., 287*
Sperry, J. R., 182*
Spies, T. D., 77
Stafseth, H. J., 23*, 122*
Stahl, William H., 122*
Stanzel, Raymond W., 577
Starkey, Arthur L., 443*
Starr, L. E., 126*, 283*, 406
Staunch, D. M., 447*
Stearns, T. W., 439*
Steckbeck, D. W., 391*
Steele, James H., 233*, 492*
Steenerson, T. L., 293*
Steensma, Rommy, 233*
Stein, C. D., 306, 410
Steiner, Alfred, 490
Stephenson, H. C., 47
Stevenson, L., 69*
Stevenson, W. G., 69*
Stewart, R. H., 126*
Stewart, S. L., 266*, 400*
Steyn, H. P., 232
Stiefel, J. R., 122*
Stiles, Geo. W., 602
Stiles, S. W., 431
Stitt, Marvin, 480
Stone, W. S., 7*
Stouder, K. W., 134
Stuart, H. O., 620
Stubbs, C. D., 178*
Stubbs, E. L., 391*, 594
Sugg, R. S., 283*
Sullivan, A. J., 181*
Summers, J. A., 135
Summers, W. A., 55
Sumner, Ruth, 177*
Sumulong, Manuel D., 539*
Sunderville, Earl, 7*
Sutherland, T. A., 285*
Sutton, J. M., 21*, 135, 178*
Swales, W. E., 28
Swanson, Leonard E., 57, 312
Sykes, J. F., 122*

T

Taber, Clarence W., 279
Taussig, Paul, 440*
Taylor, E. L., 119, 609
Theobald, A .R., 74*
Thomas, J. F., 310
Thompson, Clarence H., Jr., 220
Thompson, Edna, 283*
Thorp, Frank, Jr., 122*, 606
Tigertt, W. D., 275
Timms, W. H., 285*
Todd, G. H., 182*
Toynton, Clair, 481
Tripp, C. L., 122*
Trostle, W. G., 530
Truax, E. R., 206
Tucker, F. C., 293*
Tunnicliff, E. A., 609
Turk, R. D., 231*
Turner, John P., 38*
Turtle, E. E., 119

U

Udall, D. H., 7*
Uichanco, Jose B., 539*
Underwood, Paul C., 56
Urbain, G., 482

V

Vallee, M., 484
Vanderbilt, A. G., 73
Vanderbilt, William H., 569
Van Es, L., 52
Van Howeling, D. C., 285*
Van Tilborg, E. J., 233*
Van Volkenberg, Horatio L., 231*
Van Wormer, C., 122*
Vardiman, P. H., 613
Venzke, W. G., 439*
Vermilya, R. F., 71
Vickers, Russel R., 298
Von Ebbell, H., 533
von Ostertag, Robert, 125*

W

Walsh, F. E., 439*
Warren, D. M., 58
Warren, W. Henry, 32*
Watrous, W. C., 122*
Watson, J. H., 182*
Way, Cassius, 334
Weaver, G. L. H., 122*
Webster, Leslie T., 618
Wegner, E. E., 487*
Weil, A. J., 625
Weinman, J. E., 400
Weisner, E. S., 122*
Welch, J. F., 285*
Weller, Robert R., 487*
Welsh, Mark, 21*, 32*, 178*, 180*
Wendt, Delbert O., 321
Werner, George, 236
West, John L., 231*
West, T. H., 135
Westerfield, Clifford, 337*
White, B. B., 34
White, J. B., 439*
White, Jim, 440*
White, Paul J., 404*
Whitlock, J. H., 623
Whitney, Don, 501
Whitney, George D., 580
Whitney, Leon F., 216, 420, 580
Wight, A. E., 28, 29*, 180*, 243, 279*
Williams, G. A., 487*
Williams, G. H., 57, 170*
Williams, John C., 177*
Williams, J. D., 134
Williams, K. T., 326
Williams, Roger J., 392
Williams, W. L., 7*
Wilson, C. P., 404*
Wilson, D. Wright, 391*
Wineinger, J. M., 292*
Winters, E. S., 283*
Wolf, Arthur, 233*
Wolf, F. P., 283*
Worthy, L. C., 80
Wright, Edgar D., 293*
Wright, Wilson L., 572
Wyland, F. E., 447*

Y

Yager, G. F., 111
Yale, M. W., 117
Yiengst, Marvin J., 602
York, Walter K., 293*
Young, F. W., 122*
Young, Loie, 287*
Young, Robert, 287*
Young, Tyler, 406
Young, W. A., 287*
Young, Mrs. W. A., 287*
Yutuc, Lope M., 539*

Z

Zeissig, Alexander, 7*
Zeldner, Joseph, 443*

AS THE FALL AND WINTER MONTHS approach with their conditions conducive to respiratory diseases in the dog, veterinarians again place implicit confidence in Lederle's biologics for distemper control. Twelve years of successful use in everyday veterinary practice supported by confirming parallel research conducted on an extensive scale, have been responsible for the widespread professional acceptance of immunization with "Canine Distemper Vaccine and Virus, *Lederle*" (Laidlaw-Dunkin Method).

"Anti-Canine Distemper Serum, *Lederle,*" has earned its place in the armamentarium of the practitioner as the especially useful agent for temporary protection as well as in the treatment of the disease in the initial stages.

Confidence *in* DISTEMPER CONTROL

Also available

For infections secondary to distemper or occurring as individual entities, the following formulas are of corresponding benefits:

MIXED BACTERIN (Canine), Formula No. 1, *Lederle*

This bacterin consists of killed bacteria isolated from dogs.

FORMULA:

Brucella bronchiseptica.....40%
Streptococcus (pyogenic).....20%
Pasteurella caniseptica.....20%
Staphylococcus { albus.....10% / aureus.....10%

MIXED BACTERIN (Canine), Formula No. 2, *Lederle*

This bacterin consists of killed bacteria isolated from dogs.

FORMULA:

Salmonella enteritidis.....40%
Salmonella schottmulleri.....40%
Escherichia coli.....10%
Streptococcus (pyogenic).....10%

Packages: 20 cc. vial.

LEDERLE LABORATORIES, INC.
30 ROCKEFELLER PLAZA NEW YORK, N. Y.

You'll Be Interested to Know That . . .

D. W. Pittman, Whiteville, N. C., writes that he enjoyed reading E. T. Baker's "Difficult Calving" in the November issue. . . . He suggests that epidural anesthesia, not mentioned by Doctor Baker, is useful in cases of prolapse or in cesarean sections.

■

Dr. John R. Mohler, Chief of the Federal Bureau of Animal Industry, reports that the German invasion in 1940 of the Channel islands, home of the Jersey and Guernsey dairy breeds, has infected these cattle with foot-and-mouth disease. Russia's invasion of Finland the same year carried the infection there.

■

Dr. Fred F. McKenzie, formerly of the University of Missouri, has been appointed head of the Department of Animal Husbandry of the Utah State Agricultural College. Dr. McKenzie has just returned from South America, where as representative of the Department of State he has assisted the governments of Chili and Peru with their problems of sheep breeding at high altitudes.

■

On page 590, introducing the equine section of the review of veterinary literature presented this month, is a study of Annette K. and Brushup, the granddam and dam of the famous racehorse War Admiral. We are indebted to the editor of *The Blood Horse,* Lexington, Ky., for this. . . . The healthy-looking cattle on page 596 are from a herd near Camilla, Ga., which was used in tests on phenothiazine carried out last year by the Bureau of Animal Industry in cooperation with B. E. Carlisle, Camilla practitioner. . . . The sheep photograph on page 606 was furnished through the courtesy of the U. S. Forestry Service. The animals are on summer range in the Sawtooth Mountains of southern Idaho. . . . On page 610, the picture offers a study in swine. The show type bacon animal, the uniformity and the industry they exhibit in eating are so characteristic of purebred Hampshires as to make a striking picture. The cocker spaniels on page 614 are pedigreed puppies from the Orthodox Kennels, Whitemarsh, Pa. Photograph courtesy of Lederle Laboratories, Inc. . . . The white leghorn pullets pictured on page 620 are part of a lot used by J. W. Patton, H. H. Buskirk, and L. A. Rauls, East Lansing, Mich., in poultry feeding experiments conducted by them. . . . The earnest microscopist (front cover and page 623), typifying the spirit of scientific research, was photographed by Gordon Carson, Chicago.

E. S. Brashier, State Veterinarian of Mississippi, in reporting a serious spread of hog cholera over the state late this fall, urges all farmers who buy swine at sales, or from other farms, to have them vaccinated before adding them to their herds. This should be done even though the seller claims they have been vaccinated.

■

Dr. J. W. George, Webster County Republican, has been appointed State Veterinarian of Missouri, succeeding Dr. H. E. Curry of Kansas City. Doctor George resigned from the federal Bureau of Animal Industry to take the job. He formerly lived in Harrisonville and was once chairman of the Cass County Republican Committee.—*Lebanon [Mo.] News.*

■

Nominations are solicited for the 1942 award of $1000 established by Mead, Johnson & Company to promote researches dealing with B-complex vitamins. This recognition will be given to a laboratory (non-clinical) or clinical research worker, in the United States or Canada, chosen by judges from the American Institute of Nutrition at their annual meeting in Boston on April 5, 1942.

■

Shortly after his return from England where he had been sent by the B.A.I. at the request of the English Government to advise regarding animal disease control, Dr. Adolph Eichhorn spoke at the banquet of the Junior A.V.M.A. of Michigan State College at East Lansing. . . . He mentioned the shortage of beef in England due to an outbreak of foot-and-mouth disease in Ireland and the inability to import enough from South America. . . . Lack of concentrated foods, pushing the cows to overproduction, as well as increased and unchecked bovine tuberculosis, are all factors responsible for the low milk supply in Britain, in the opinion of Doctor Eichhorn.

■

The Hon. George W. Gillie, Captain in the Veterinary Reserve Corps, reported in the Congressional Record of October 6th, on his tour of duty in the Army. He was assigned to the 1st Cavalry Division, at Fort Bliss, as assistant to the Division Veterinarian, for 28 days beginning July 5. Doctor Gillie quoted General Innis P. Swift, Commandant at Fort Bliss, as saying that Hitler used more than 700,000 horses in the Polish and French campaigns, and that he had the firm conviction that cavalry has a very vital role in modern warfare, especially in fighting over rough terrain. The General also is of the opinion that when the terrain is so rough that trucks cannot negotiate it to carry supplies to the cavalry, this should be done by air transport.

". . . These pigs were marketed a short time ago at a price of $8.90 per cwt., when the top price paid that day was $8.95."

So ends a letter from an Illinois veterinarian* who recommended Cutter B.T.V. to a client who had complained of the arrested growth following serum-virus.

Field experience has proven that a single dose protects against cholera until marketing — just as each lot of B.T.V. must prove its immunizing ability in the laboratory, by protecting susceptible pigs against a subsequent dose of virus which uniformly kills the controls.

Assure greater profits for your clients by avoiding virus "stunting"—and less grief for yourself by avoiding virus "breaks" and flare-ups of secondary infections. Vaccinate with Cutter B. T. V.—the *safe* hog cholera vaccine that eliminates disease-producing virus from the field.

**Name on request*

CUTTER Laboratories

BERKELEY, CALIFORNIA • 111 N. CANAL ST., CHICAGO • 138 W. 53rd ST., NEW YORK

Classified Advertisements

For Sale, Wanted, etc., $2.00 for 25 words or less, additional words, 8 cents. 25 cents extra when replies are sent in care of VETERINARY MEDICINE.

WORLD MAP OF DOGS—Unique, Educational; 19" x 24"; $1.00 each (3 for $2). Also Chart of All American Breeds, same size, same price. Only complete American work on dogs, **Judy's Dog Encyclopedia**, $5. Judy Publishing Co., 3323 Michigan Blvd., Chicago, Ill.

FOR SALE: Completely equipped small animal hospital. Well established in large west Pennsylvania city. Low rent. Priced reasonably. Address No. 346, care of VETERINARY MEDICINE.

WANTED: Assistant Veterinarian for small-animal hospital in exclusive north shore suburb of Chicago. Prefer man in late 20's or early 30's; recent graduate would be considered. Live on premises. Room and board, attractive salary. Start at once. State racial descent. Address No. 344, care of VETERINARY MEDICINE.

FOR SALE: Owing to recent death of my husband, a Wisconsin mixed practice well established in city of 30,000 and in prosperous farming community. Wonderful opportunity. Address No. 340, care of VETERINARY MEDICINE.

WANTED: Assistant Veterinarian for small animal hospital in Baltimore, Md. Prefer young, single, recent graduate. Applicant to live on premises. When answering state age, salary expected, and give three references. Enclose snapshot picture. Address No. 341, care of VETERINARY MEDICINE.

WANTED: Copy of "Veterinary State Board Questions and Answers," by V. G. Kimball. 1917 or 1920 edition preferred. Give price and edition. Address S. H. Hoffer, Box 295, College Station, Texas.

VETERINARIAN, young, single, experienced, desires position with country practitioner. Licensed in Michigan, Ohio and Pennsylvania. Address No. 345, care of VETERINARY MEDICINE.

"HORSESHOES OF INTEREST TO VETERINARIANS" by the late Prof. Henry Asmus, Cornell University. This new book on horseshoeing contains 164 illustrations of shoes for both healthy and defective hoofs and for several kinds of lameness, with full description of each. Useful to the general practitioner as well as to the specialist on lameness in the horse. Price $1.00. Address Mrs. Henry Asmus, 7 Reservoir Ave., Ithaca, N. Y.

Udall's "PRACTICE OF VETERINARY MEDICINE," 3rd Edition. This book is an outstanding authority for the progressive veterinarian. He should not fail to have it in his library. The 3rd edition contains many more illustrations and the printed matter has been increased 20% over the previous edition. It includes the latest known developments and approved methods of veterinary therapy. Price $6. Address Veterinary Magazine Corp., 7632 S. Crandon Ave., Chicago, Ill.

McKeon's "Sulpho Dip" ***Sold only to Veterinarians***

is a water-soluble sulphur compound which evaporates, leaving the sulphur directly on the surface where wanted. It is miscible in many oils. Uniformly satisfactory in the treatment of practically all forms of parasitic skin diseases where sulphur therapy is indicated, such as sarcoptic mange, itch, dry and moist eczema and the lesser forms of skin diseases. Contains no cresylic acid coal tar or creolin; hence is safe for cats and other animals susceptible to such poisons. About 95% deodorized; generally leaves no objectionable odor on household pets. Guaranteed by SULPHUR PRODUCTS CO., Greensburg, Pa.

SAMPLE! SURE!

Dealers and Side Line Representatives Wanted

Army Veterinary Service

Transfer.—Capt. Karl H. Willers, from the General Dispensary, Washington, D. C., and from additional duty at Bolling Field, and the Army War College, to the Quartermaster Market Center, N. Y., Oct. 22.

Retirement.—Major Herbert M. Cox, upon his own application, retired from active service, and relieved from duty at Camp Shelby, Miss., Jan. 31, 1942.

Temporary Appointments.—To Captain: 1st Lieuts. Harold Meyers Deane, Edwin Joseph Sunderville, William Edward Bills, and Harry John Robertson, Oct. 10.

Veterinary Reserve Corps

Promotions.—To Major: Capt. Ashley J. Joyner, Oct. 22. To Captain: 1st Lieuts. Pearl Hugh Hand, Oct. 4; William S. Gochenour, Roy Alonzo Resseguire, Oct. 14; Henry J. Lindenstruth, Oct. 21; John E. Craige, Oct. 23; Hilding M. Marlowe, Emil L. Koch, Russell S. Wann, Oct. 25; Walter Alvin Anderson, Warren Lang Skinner, Edwin James Smith, Wendell Lee Kanawyer, James Howard Hathaway, William Hyde Dieterick, William Russell Hulbush, Ralph D. Barner, Lee Roy Chapman, James Durand Ramsey, Alpheus Heise Seeley, Robert H. Hartman, Charles J. Whitehead, Harry A. Gorman, Jon Alan McCurdy, Burton G. Thomson and Horace R. Collins, Nov. 1.

Transfers.—Capt. Gerald W. Holmberg, from the Quartermaster Market Center, Philadelphia, Pa., to the General Dispensary, U. S.

MIDDLESEX UNIVERSITY

School of Veterinary Medicine

Waltham, Massachusetts

◆ ◆

Four-year course leads to D.V.M. degree. New buildings for dormitories, classrooms, laboratories, animal hospital, clinic, and live stock, on 100-acre campus.

High school graduates accepted for the two-year preveterinary college course required for admission to the School of Veterinary Medicine.

Write for catalogue to

EDGAR A. CROSSMAN, M. V. D.

Dean of the School of Veterinary Medicine

Army, Washington, D. C., and to additional duty as attending veterinarian, Army War College, and Bolling Field, D. C.; Capt. Joseph J. Merenda, from Fort Slocum, N. Y., to headquarters, Second Corps Area, Governors Island, N. Y.; 1st Lieut. John E. Craige, from Fort Sam Houston, Texas, to the Ninth Corps Area Laboratory, Presidio of Monterey, Cal.; 1st Lieut. James G. Anderson, from the New York Port of Embarkation, Brooklyn, N. Y., to the Second Corps Area Service Command at Fort Slocum, N. Y.; 1st Lieut. Thomas J. Guilfoil, from the Chicago Quartermaster Depot, Chicago, Ill., to headquarters, Third Corps Area, Baltimore, Md., Nov. 1st; 1st Lieut. Harold L. Geick, from the Chicago Quartermaster Depot, Chicago, Ill., to the General Dispensary, U. S. Army, Philadelphia, Pa., Nov. 20.

Ordered to Extended Active Duty.—Capt. Fred J. Bolender, San Francisco Quartermaster Market Center, San Francisco, Cal.; 1st Lieut. Albert Morris Zlotnick, New Jersey Quartermaster Depot, Jersey City, N. J.

■

Coming Meetings

United States Live Stock Sanitary Association, 45th annual meeting, Hotel La Salle, Chicago, Ill., Dec. 3-5, 1941.

Nebraska State Veterinary Association, Lincoln, Nebr., Dec. 10, 1941.

Western New York Veterinary Medical As-

Internal Iodine

They eat it on the Feed

Best Oral Iodine

Soluble Iodine

Single Strength

Pint $.60 Gallon $3.50

Double Strength

Pint $.95 Gallon $5.70

CURTS-FOLSE LABORATORIES

71 Central Avenue
Kansas City, Kansas

Vital Cogs in the Wheels of Preparedness—the Men of the Veterinary Profession . . . and

ARMOUR'S FOWLER BRAND ANTI-HOG CHOLERA SERUM!

In these times of emergency, it is of the greatest importance that our nation have an ample supply of meat. The men of the Veterinary Profession are leaders in the determined fight to protect livestock production for the health-defense of our country. And Armour's Fowler Brand Anti-Hog Cholera Serum and Hog Cholera Virus are the Veterinarians' potent weapons in combating the most dreaded of all swine diseases.

Armour's Fowler Brand Serum is proved dependable by test after test—in the laboratory, and in the field. Its quality is assured by the watchful care that is taken in every step of the manufacture. Graduate Veterinarians supervise the preparation of Armour's Fowler Brand Serum . . . and it is made from the most carefully selected materials—with the finest of modern equipment and technique.

• • •

Your ARMOUR'S FOWLER BRAND Serum and Virus needs can be quickly and easily filled at most Armour Branch Houses or Creameries; or by Dr. Robt. D. Wall, 910 28th Street, Des Moines; Dr. Robt. J. Hoskins, 3203 East Washington Street, Indianapolis; Mr. A. G. Carter, Findlay, Ohio; Dr. H. W. Brown, 623 West Main Street, Fort Wayne; Mr. Oliver W. Nelson, Nelson Laboratories, Sioux Falls, S.D.

ARMOUR and COMPANY

VETERINARY DIVISION
KANSAS CITY, KANSAS

sociation, annual meeting, S. P. C. A. building, Buffalo, N. Y., at 1 p. m., Dec. 11, 1941.

South Dakota Veterinary Association, Hotel Carpenter, Sioux Falls, S. D., Dec. 11-12.

Delaware Veterinary Medical Association, Dutch Village, DuPont Blvd., near Wilmington, Del., Dec. 18, 1941.

American Association for the Advancement of Science, Dallas, Texas, Dec. 29, 1941.

Arkansas, Mississippi and Tennessee Associations (joint annual meeting), Memphis, Tenn., Jan. 5-7, 1942.

SPECIAL
DAIRMOL DUSTING POWDER
FOR GRANULAR VAGINITIS
Antiseptic Astringent

"THE DAIRMOL WAY"

Compounded under the direction of two veterinarians of exceptional experience.
Highly recommended by leading herdsmen as the best treatment for the purpose.
Extensively used among prominent practitioners.

DALARE ASSOCIATES
DEPT. Y-121 23rd & Locust Sts. PHIADELPHIA, PA.

Oster
The Veterinarian's Clipper

Better For You
Because
Smaller -:- Lighter
Smoother -:- Quieter

An All Year Aid
The Detachable Head feature gives you a complete service — Clipping, Plucking Length Clipping, and Surgical Shaving.
Price $25.00. Folder free upon request.
JOHN OSTER MANUFACTURING COMPANY
Racine, Wisconsin, U. S. A.

Cornell Conference for Veterinarians, New York State Veterinary College, Ithaca, N. Y., Jan. 7-9, 1942.

Ohio State Veterinary Medical Association, Columbus, Ohio, Jan. 7-9, 1942.

Minnesota State Veterinary Medical Association, 45th annual meeting, Minneapolis, Minn., Jan. 8-9, 1942.

Oklahoma Veterinary Medical Association, 27th annual meeting, Oklahoma City, Okla., Jan. 12-13, 1942.

Indiana Veterinary Medical Association, Severin Hotel, Indianapolis, Ind., Jan. 13-15.

Rhode Island Veterinary Medical Association, Narragansett Hotel, Providence, R. I., at 2 p. m., Jan. 13, 1942.

New Brunswick Veterinary Association, St. John, New Brunswick, Jan. 14, 1942.

South Carolina Association of Veterinarians, Columbus, S. Car., Jan. 20, 1942.

Texas State Veterinary Medical Association, Fort Worth, Texas, Jan. 20-21, 1942.

Illinois State Veterinary Association, annual meeting, Springfield, Ill., Jan. 22-23, 1942.

Ontario Veterinary Association, Toronto, Ont., Jan. 27-28, 1942.

Iowa Veterinary Medical Association, Des Moines, Iowa, Jan. 27-29, 1942.

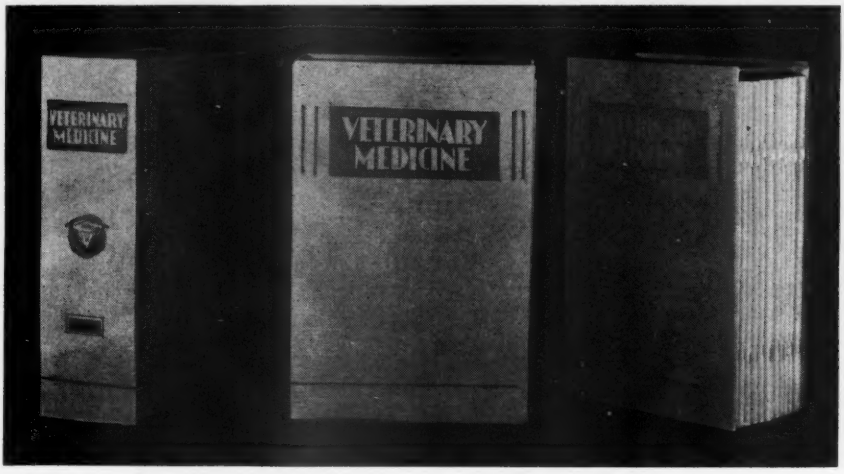
RESULTS-OR-REPLACEMENT

M·A·C
ACCEPTED AND USED BY THE VETERINARY PROFESSION SINCE 1900
IN THE TREATMENT OF EQUINE LAMENESS INVOLVING BONE, BURSA OR TENDON
"M. A. C. HAS NEVER BEEN SUCCESSFULLY IMITATED"
CARTER-LUFF CHEMICAL CO., HUDSON, N.Y.

PRICES
SINGLE BOTTLE $ 2.00
¼ DOZEN
1 BOTTLE FREE 5.00
½ DOZEN
2 BOTTLES FREE 8.00
1 DOZEN
4 BOTTLES FREE 15.00
2 DOZEN
4 BOTTLES FREE 25.00
AGENTS SOUTHERN STATES
Kentucky Serum Co.
LOUISVILLE, KY.
FOR PRICES IN CANADA WRITE TO
Wingate Chemical Co.
MONTREAL

PRACTICAL FILING CASE for "VETERINARY MEDICINE"

Holds 12 Issues ***40 cents each, three for $1.00, postpaid***



Keeps copies clean and handy for reference and in order.
Attractively printed to resemble a book when in a bookcase.
Spring-like flaps in back hold single copies or any number up to 12, vertical.
No wires or rods; just slide magazines in back between flaps.
Sturdily constructed of durable kraft cardboard.
Tested and enthusiastically adopted by libraries.
Start a set of "books" with your VETERINARY MEDICINE copies.
Order for back years as well.
They cost so little and do so much you are bound to be pleased.

Even if you have your magazines permanently bound at the end of the year this file is well worth while to preserve them and have them always available during the year of publication. The importance of keeping copies of veterinary periodicals for reference can hardly be overemphasized. In a recent letter Dr. J. G. Horning says:

> "I devote some time each week to reading copies of V. M. of other years. It is like a tonic. If the young man entering the profession could be induced to read current veterinary periodicals and preserve them and use them he could not help but be a better veterinarian. These old magazines are a source not only of information but inspiration and satisfaction as well. Preserve them. File them. Read them."

Veterinary Magazine Corporation
7632 S. Crandon Ave., Chicago

"We Wouldn't Be Here If It Weren't for

PERANDREN*"

—Testicular Hormonal Substance Restores Copulatory Power in Impotent Dogs

Excellent results are being obtained from the use of PERANDREN in sexually impotent male humans and various animals, small and large. Particularly good are reports concerning selected cases of impotence in dogs injected with PERANDREN, "Ciba", a form of the most powerful male sex hormone known. Tying ensued in a matter of 24 to 48 hours with subsequent litters of healthy whelps.

LITERATURE UPON REQUEST

*Trade Mark Reg. U. S. Pat. Off. Word "Perandren" identifies the product as testosterone propionate of Ciba's manufacture. Available through usual trade channels.

CIBA PHARMACEUTICAL PRODUCTS, INC.
Summit, New Jersey

The Red Cross Serves

The American Red Cross, always in the vanguard when help is needed, has been called upon by the Surgeons General of the Army and Navy to establish blood banks for use in case of disaster. In response to this request there has been formed the American Red Cross Blood Procurement project, the objective of which is to organize and establish blood banks and to maintain a file of registered donors, in all cities of the nation. These banks are being organized rapidly in the larger cities.

MASON'S *Kennel Fences*

Used by Leading Dog Hospitals

5 Runs $97.20

Pens $16.25 and up

Mason's are Real Kennel Fences—Strong, Good Looking and sold under a Money Back Guarantee to hold the largest and strongest dogs.

SEND FOR FREE CATALOG

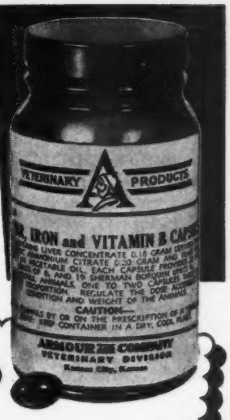
If planning a new hospital or equipment, get this book. It quotes Low Direct Factory Prices on Kennel Fences, Dog Proof Gates, Steel Kennel Stalls and Doors.

54 Pages 147 Illustrations

MASON KENNEL FENCE CO., Box 77, Leesburg, Ohio

When the blood picture is below normal . . .

LIVER, IRON AND VITAMIN B SEALED CAPSULES ARMOUR



★ Liver, Iron and Vitamin B Sealed Capsules *Armour* are a convenient, easily assimilated combination of liver, iron and the Vitamin B Complex.

Their function is manifold. The liver and iron are important "blood builders". The Vitamin B Complex factors are essential to proper nerve function . . . as appetite stimulants . . . in assuring normal digestion. . . . Thus it may be seen that Liver, Iron and Vitamin B Sealed Capsules *Armour* are worthy of serious consideration whenever the blood picture is below normal . . . whenever anemia or general debility and loss of "tone" requires prompt, effective treatment.

Each airtight, fused capsule contains: Liver Extract Concentrate . . . 0.16 gram; Iron and Ammonium Citrate . . . 0.20 gram; Vitamin B. Complex q. s. . . . to furnish 22 International Units of B_1 and 19 Sherman-Borquin Units of B_2 suspended in a neutral medium.

Available in bottles of 100, 500 and 1,000 capsules.

FOR PROMPT ATTENTION, DIRECT YOUR ORDER TO VETERINARY DIVISION

ARMOUR AND COMPANY
KANSAS CITY, KANSAS

All Red Cross beneficence is supported entirely through the annual membership dues received during Roll Call. Because of the unparalleled demands put upon it by the world condition, the Red Cross has urgent need of many new members so that victims of disaster may receive immediate and proper care.

If you are a member of the Red Cross, pay up promptly; if you are not a member, there will never be a more propitious time to join than now, during the Annual Red Cross Roll Call, November 11th to 30th.

In this present emergency the *health* of our *domestic animals* is of the highest importance.

THERAPOGEN

with its manifold uses is an invaluable aid to that objective.

THEODORE MEYER EST.
213 S. Tenth Street
Philadelphia, Pa.

Practitioners' Association Stops Illegal Practice

A permanent restraining order was issued by the judge of the circuit court of Pettis County, Missouri, against an individual—non-graduate — who was practicing veterinary medicine without a state license. The action was brought in the name of the president of the Practitioners' Association and another member.

In accord with its policy of helping veterinary practitioners everywhere, the Practitioners' Association is collecting evidence against a number of alleged illegal practitioners in other states for the purpose of bringing actions against them similar to the successful prosecution in Pettis County. The ruling of the Missouri judge will constitute a valuable precedent for the decisions of judges elsewhere.

The Secretary writes: "We are a healthy young association and are showing gratifying results in our endeavors to promote the interests of our branch of the veterinary profession —the practitioners." For information and membership application forms address: Dr. J. C. Flynn, Secretary, 3026 Main St., Kansas City, Mo.

■

The Veterinary Profession means just as much to mankind as does the Medical Profession.—*T. Henry Foster,* President, John Morrell & Co.

Deaths of Veterinarians

Sterling M. Reagan, 74, Hillsboro, Ore., Kansas City Veterinary College '04, August 1.

Arthur R. Blythe, 38, White City, Kans. Killed in automobile accident at Dubuque, Iowa. Services were held August 14.

Malcolm J. Rattray, 54, Vidalia, Ga., Alabama Polytechnic Institute '12, August 16.

William R. Claussen, 89, Madison, Wis. A native of Denmark, he came to the U. S. in 1871. University of Pennsylvania '16, August 29.

Harry J. Getman, 70, Spring Lake, Mich., Grand Rapids Veterinary College '06, September 5.

John B. Wright, 74, St. Joseph, Mo., September 7.

Harry E. Wimer, 64, Eagle, Idaho, September 18.

E. T. Hott, 73, Martinsville, W. Va. Formerly City Councilman, September 23.

W. O. Hughes, 53, West Point, Miss., Indiana Veterinary College '16, September 30.

David Fox, 76, Sacramento, Calif., October 5.

Henry H. Mayberry, 79, Nashville, Tenn., October 16.

G. J. Sexton, 56, Sumner, Ia., October 18.

Thomas W. Johnston, 74, Dayton, Ohio. Former Food Inspector of Dayton. Ontario Veterinary College '92, October 21.

Hiram M. Michener, 63, North Wales, Pa., University of Pennsylvania '12, October 25.

Authorized Veterinary Medicine

BINDING

The publishers have effected an arrangement with one of America's foremost, old established bookbinders by which subscribers can have their copies economically bound to the specifications of Veterinary Medicine in handsome, lasting volumes.

Bound complete with Index. 12 issues per volume, January to December, inclusive. Subscriber's name stamped in gold, if desired, at no additional cost. Bound books will be sent express collect. Copies should be sent prepaid. Check or Money Order should accompany order, made payable to:

DE LUXE BOOK CLOTH — Distinctive pattern. A quality binding that is durable, attractive, and waterproof.
Price....$1.50 per Vol.

THE BOOK SHOP BINDERY

308 W. Randolph St. Chicago, Ill.

Specializing in the binding of new and old books, magazines and manuscripts.

RED UDDER LINIMENT

The incorporation of the costly azo dye, Biebrich Scarlet Red, with camphor, wintergreen, turpentine, and chloroform in a heavy emollient base has given us the finest product known for treating inflammations of the udder. RED UDDER LINIMENT will not stain the hands but penetrates and stains the udder, leaving the odor of wintergreen throughout the barn. Give your clients an opportunity to compare this product with cheap "salves" so widely sold by lay houses and we know that RED UDDER LINIMENT will soon be one of your best dispensing items.

Dozen 350cc Bottles..$3.50
1 Gallon.....$3.00

Send check with order

VETERINARY PRODUCTS CO.
NEW CASTLE, IND.
J. J. ARNOLD, D.V.M., President
Finest Pharmaceuticals at Lower Cash Prices.
Write for Our Price List. *Jobbers Solicited.*

Civil Service Examinations

The examination for Junior Veterinarians announced earlier by the Civil Service Commission, has been superseded by one which provides not only for the position of Junior Veterinarian at $2000 per year but for the position of Assistant Veterinarian at $2600. The Assistant Veterinarians will, in part, have much the same duties as the Junior but, in addition, they will inspect dairy and other food products in C.C.C. camps, and make milk sanitation surveys, also advise state and local health departments on milk sanitation problems. To be eligible for the position of assistant veterinarian, the applicant must have had two years experience in inspecting food and dairy products. Information and application blanks may be obtained from any first or second class postoffice or from the Civil Service Commission in Washington, D. C.

■

The extension service of the College of Agriculture of Wisconsin has issued a special circular entitled "Prevent Swine Erysipelas."... Dr. B. A. Beach, of the Department of Veterinary Science of the college, warns that this disease is on the increase in Wisconsin and cautions against buying animals and adding them to healthy herds, since this practice is largely responsible for the spread of the disease.

SAVE MONEY
ON YOUR
INCOME TAX
BY USING THE
HISTACOUNT
Reg. U. S. Pat. Office
BOOKKEEPING SYSTEM

●

ASK ABOUT OUR FREE
10 DAY TRIAL OFFER

●

PROFESSIONAL
PRINTING COMPANY, INC.
America's Largest Printers to the Professions
15 EAST 22ND STREET, NEW YORK, N. Y.

Repeat Sales Tell the Story of *Fistone's Success*

Veterinarians throughout the country have used FISTONE successfully. They have tried it, found to their satisfaction that it does everything we claim for it.

The unequalled efficacy of FISTONE against the chronic suppurative affections is acknowledged by many veterinarians.

Also, FISTONE plays an important part in its role of a conditioner, as the well-being of any animal afterwards is most important.

The Fistone and Appliance Company
College Corner, Ohio

Enclosed please find check for $8.00 for which send me one dozen 12-ounce boxes of FISTONE (Trial Order) once only. (Regular price $10.) One-half dozen boxes $5.00.

Dr. .....

Address .....

For the Veterinarian

PHARMACEUTICALS

Specialized formulae compounded especially for the needs of the busy practitioner.

BIOLOGICS

Large stock of well known products.

INSTRUMENTS

Complete line of all Veterinary instruments and sundries.

Detroit Veterinary Supply Co.

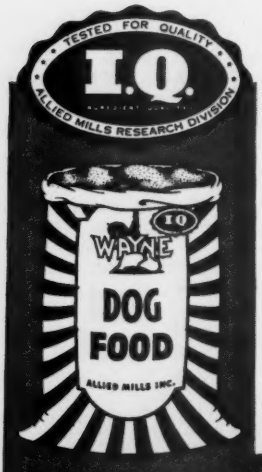
1792-98 Wabash Ave. **Detroit, Michigan**

Canadian Branch—Windsor, Ont.

Why it Pays to Recommend This

NEW FEEDING PROGRAM

For Dogs!



Dog owners value highly professional advice that tells them not only how to feed well but how to feed economically with safety.

Heretofore, the most economical feeding programs were endangered by the uncertainties of nutritional qualities. But now, through a sensational new triple test system, Wayne I-Q Dog Food protects feeding values and makes your recommendation safe and profitable, not only for the dog owner, but for you, too.

Send for free sample and complete scientific information about the Wayne Triple Testing System.

ALLIED MILLS, INC.

EXECUTIVE OFFICES - CHICAGO - SERVICE DEPT. - FORT WAYNE, IND.

MILLS AT: OMAHA, PEORIA, E. ST. LOUIS, FORT WAYNE, MEMPHIS, BUFFALO, PORTSMOUTH VA.